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THE BOSTON Medical and Surgical JOURNAL

OFFICIAL ORGAN of THE MASSACHUSETTS MEDICAL SOCIETY and of THE NEW ENGLAND SURGICAL SOCIETY

$5 per Annum, 15c per copy
Vol. CLXXXIII, No. 10

THURSDAY, SEPTEMBER 2, 1920

Published weekly in Boston, at 126 Massachusetts Avenue

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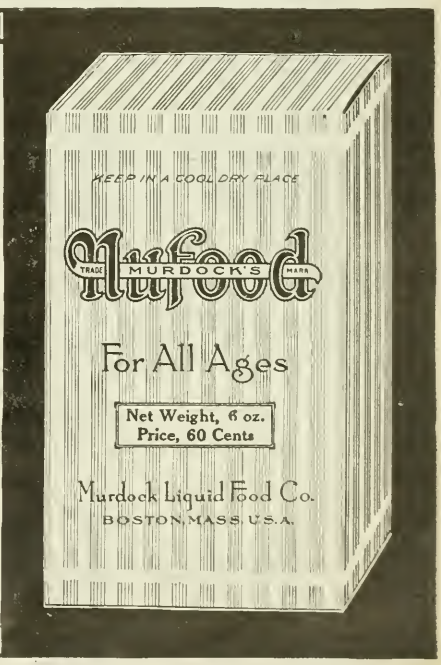
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JOHN B. HAWES, 2D, M.D. LESLEY H. SPOONER, M.D.
EDWARD H. RISLEY, M.D. WILDER TILESTON, M.D.

MEDICINE.

PNEUMO-PERITONEAL ROENTGEN-RAY DIAGNOSIS.

STEIN, A., AND STEWART, W. H. (*Jour. A. M. A.*, July 3, 1920) make a further detailed report on this procedure. They have further simplified their method and by so doing have added greatly to its simplicity and efficiency and safety. The only instruments are a lumbar puncture needle, rubber tube, and oxygen tank, the former two articles being sterilized. The patient is prepared as for any roentgen-ray examination, by a thorough draining out of the bowels and emptying of the bladder before inflation. One-sixth of a grain of morphine is administered one half hour before inflation. The skin is prepared with iodine. The point of insertion of the needle is two fingers breadth below the umbilicus in the median line. The amount of gas used varies between two and four liters. The oxygen used does not need to be sterilized. No injuries to the intestines have been encountered. About one-third of the patients complain of marked pain between the shoulders following distention of the abdomen to full capacity. No heart symptoms have ensued except slight rise in pulse.

Lately the authors have employed deflation after examination, by reinsertion of the needle and allowing the gas to pass off. No harmful effects have been so far encountered. The procedure is contraindicated in valvular disease of the heart and in alcoholics. The article is well illustrated.

[E. H. R.]

BOTULISM FROM CANNED BEETS.

RANDALL, W. G. (*Jour. A. M. A.*, July 3, 1920) reports an outbreak in Florence, Arizona, due to commercially canned beets in tin containers. There were four deaths. The cases are reported in detail.

[E. H. R.]

SURGERY.

SOAPS IN RELATION TO THEIR USE FOR HAND WASHING.

NORTON, J. F. (*Jour. A. M. A.*, July 31, 1920). Sterile hands are not obtained in the ordinary process of hand washing. More bacteria were found to be removed by the ordinary toilet soaps than by the special soaps. In other words, the cleansing properties of a soap are more important than its "germicidal" or "antiseptic" constituents.

The soap solutions obtained in hand washing are of no practical germicidal or antiseptic value.

The soap left on the hands after washing has no germicidal action.

In the whole process of hand washing done in the usual manner, the special so-called "germicidal" or "antiseptic" soaps exhibit none of these properties. Therefore, these terms are not proper to use in connection with soaps.

Finally, since the hands may serve as a medium for the conveyance of bacteria in infectious diseases, it is important to remove these bacteria; and this may be done by the ordinary toilet soaps as effectively, if not more so, as by the special brands of so-called "antiseptic" or "germicidal" soaps.

[E. H. R.]

(Continued on page vi.)

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(Continued from page iv.)

PATHOLOGY.

Tertiary Malaria Parasites.

Lawson, M. R. (*Jour. of Exp. Med.*, August, 1920) finds that:

1. Malarial parasites destroy more than one red blood corpuscle, migrating to another as soon as one is destroyed.
2. Pigmented segmenting parasites attached to red corpuscles whose hemoglobin is intact or nearly so are *prima facie* evidence of migration.
3. Infected corpuscles in tertian infections may be enlarged as a result of the large size of the attached parasite as well as by parasitic action.
4. The young parasites resulting from the segmenting bodies attached to healthy red corpuscles usually attach themselves independently to the infected corpuscle and remain there until the corpuscle is destroyed. [E. H. R.]

MEDICINE.

Late Hereditary Syphilis.

Carter, M. R., and Valle, D. D. (*Surg., Gyn., and Obstet.*, August, 1920) write a very thorough clinical article which deals largely with the intestinal and peri-intestinal manifestations of late syphilis. Defects of conformation of the intestinal tract are often greatly aggravated by this disease. All of the cases should be given mixed antisyphilitic treatment and then resort made to surgery when definite indications are present, which they very frequently are. Combined medical and surgical treatment gives good promise of results that are satisfactory. [E. H. R.]

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The Massachusetts Medical Society.

MEETING OF THE SECTION OF SURGERY, JUNE 8, 1920.

MULTIPLE RESECTIONS OF THE SMALL INTESTINE.

REPORT OF A CASE OF BULLET WOUND OF THE ABDOMEN WITH MULTIPLE PERFORATIONS OF THE BOWEL AND MESENTERY, TREATED BY PRIMARY RESECTION OF THREE SEGMENTS WITH END-TO-END ANASTOMOSES BY MEANS OF MURPHY BUTTONS, SECONDARY DRAINAGE OF JEJUNUM, FINAL CLOSURE OF FISTULA, AND COMPLETE RECOVERY. CONSIDERATION OF SURGICAL PRINCIPLES INVOLVED.

BY ERNEST L. HUNT, M.D., F.A.C.S., WORCESTER, MASS.

[From the Surgical Service, Worcester City Hospital.]

IN presenting this paper to a gathering in which I recognize many surgeons of greater experience than mine, I am not unmindful of the danger that I may on the one hand overemphasize principles already well established or, on the other, enthuse unduly over a result perhaps more due to good fortune than good surgery. Were it not that an extensive, though by no means exhaustive, search of the literature since the beginning of the war, has failed to uncover an exact parallel, I should hardly have the temerity to ask your attention to a single case and its lessons as I interpret them.

In the field of penetrating wounds of the abdomen war experience brought us back to the point of view of civilian practice, namely, that with anything like adequate facilities, and in the absence of certain well understood contraindications, recent penetrating wounds probably involving hollow viscera should be explored and the damage repaired with the least possible delay. It is not my purpose, however, to arrest your attention on this point or to discuss the degree to which it is held or its legitimacy; but rather to consider the question of what may be done in the presence of an intestine so greatly damaged by the passage of a missile as to render simple suture impractical. The high mortality experienced by all workers in this field justifies the sober consideration of any means which may in the least degree contribute to more successful handling of these emergencies. As bearing on this point let me quote from Tuffier,[1] who said in 1916, "As regards laparotomy for a wound of the small intestine with suture resulting in cure, I do not think (from inquiries I have made at the front) that there exist at the present time twenty such cases in the French Army."

Reviewing the text-books one hardly discovers reference to multiple resections as a possi-

bility. Generally one is left to assume that when a resection is to be done a single segment must take in the whole damaged area although Moynihan[2] in his "Abdominal Surgery" says, "In rare occasions a double or even a triple resection may be necessary." Similarly, a perusal of the periodical literature, with rare exceptions, leaves one with the definite feeling that a single resection is all that is to be considered. Writers dwell upon the length of segments removed but it is rarely we find a report of double resections. Only twice did I find mention of the removal of more than two segments and they were not successful. In a review of 1200 cases of gunshot wounds of the abdomen, Cuthbert Wallace[8] says, "Double resections in this series have always been fatal, though I know of one successful case." I have been able to find in the literature, so far as I have been able to review it, but twenty cases of resection of more than one segment, some of which were reported singly while others were found in group reports of cases of this general class. It is hardly reasonable to suppose that these constitute more than a fraction of the number which exist but which have not yet been published or reports of which I have not come across.

It is, however, quite plain that the majority of surgeons regard the amount of bowel sacri-

TABLE I.

RECORDED CASES OF RESECTION OF INTESTINE WHERE MORE THAN ONE SEGMENT HAS BEEN REMOVED.

AUTHOR	RESECTIONS	SEGMENTS	ANASTOMOSIS	RESULTS
Codman[4]	1 small int. 1 colon		Lateral	Recovery
Webb and Milligan	2 ileum	9 in. 2½ ft.	Lateral	Recovery
Okinczye	4		End-to-end	Death
	2 small int.		1 end-to-end 1 lateral	Death
	1 small int. 1 colon		End-to-end End-to-end	Death
	1 small int. 1 colon		End-to-end End-to-end	Death
Wallace, Cuthbert[8]	2*			Recovery
Paschini[17]	2 small int.	1.5 meters		Recovery
Taylor, G.[3]	1 jejunun 1 ileum	4 ft. 2½ ft.		Recovery
	1 tr. colon 1 jejunum	3 ft.	End-to-end	Recovery
	1 ileum 1 sigmoid	18 in.	End-to-end	Recovery
Darling, S.[13]	2 cases 2 small int.			Death
Doan, A.[12]	1 small int. 1 small int.	1 ft. 3 ft.	End-to-end End-to-end	Death
Meyer and Taylor[14]	1 ileum 1 jejunum	4 in. 18 in.	End-to-end End-to-end	Death
	1 ileum 1 jejunum	4 in. 9 in.	End-to-end Lateral	Evac. 16th day
	1 ileum 1 jejunum	4 in. 9 in.	End-to-end End-to-end	Death
Hughes and Rees[15]	3 small int.			Death
	Ileum Colon			Death
	2 small int.†			Death
Hunt, E. L.	1 jejunum 1 ileum 1 ileum	21 in. 13 in. ½ in.	Murphy button Murphy button Murphy button	Recovery

Total: 21 cases; 12 deaths; 9 recoveries.

Three cases with more than two segments resected, one recovery (author's case.)

* Mentions case not his own. † Also wounds of leg.

ficed as of less moment than the dangers and loss of time incident to multiple resections and the necessary repair work. Owen Richards[9] insists upon the necessity of making the resection sufficiently ample to exclude the possibility of suturing devitalized gut, and says " . . . . it is doubtful if the difference in shock is very great; and whereas the risk of an insufficient resection is death, that of an excessive resection is more likely to be indigestion." He quotes a successful resection of seven and a half feet and states that the large ones recover as well as the less extensive.

It is here the experience I wish to relate is not in complete accord with that of the majority, and while I do not wish to be understood as assailing the wise principle of a single resection where a reasonable amount only need be sacrificed, I think one may say that it does not bear the force of an absolute rule of procedure.

CASE.

F. L., Italian, male, aged 27, barber. Injury —Shot at close range with a large calibre automatic about 9 o'clock P.M., January 18, 1920. Brought to accident room at Worcester City Hospital where he was noted as conscious and rational but suffering great pain. The wound of entrance was situated in the lower left quadrant of the abdomen, was nearly circular in shape, 1 cm. in diameter, and bleeding but slightly. The abdomen was moderately distended, tender and spastic, with dullness in both flanks; pulse 110; no vomiting. Any attempt to move him caused great pain. Morphine was injected and then the bullets were located by x-ray lying outside the abdominal cavity in the neighborhood of the right hip-joint, both apparently having entered through the same wound.

Working Diagnosis. Bullet wound of abdomen, internal hemorrhage with injury to hollow viscera, moderate shock.

Operation, at 11 P.M., ether anesthesia, Dr. Hunt, assisted by Dr. Fipphen. Low median laparotomy found much free blood in peritoneal cavity and active bleeding from torn mesenteric vessels. Systematic exploration found eleven perforations of the small bowel in two groups, one in lower jejunum and the other in the ileum, with two considerable rents in the mesentery of these portions. Eighteen inches above the ileocecal junction was another wound which practically severed the gut. Considerable spilling of intestinal contents had occurred. Bleeding points were secured, one isolated perforation was sutured, two sections of intestine 21 inches and 13 inches in length respectively were resected and end-to-end anastomoses accomplished by Murphy buttons, closing the gaps in the mesentery by double rows of catgut. At the point where the bowel was nearly severed another short resection and similar anastomosis was done. The coils were washed liberally with hot saline solution and, the joints appearing competent, were returned to abdomen, two cigarette drains passed to the pelvis and the wound closed layer by layer. The wound of entrance was excised, partly sutured and a wick inserted. No attempt was made to get the bullets. Post-operative condition was good, pulse 108.

Prophylaxis—1500 units antitetanus serum was injected shortly after reaching ward.

PROGRESS.

The first two days developed no markedly unfavorable symptoms but the third found him suffering with gas pains which increased rapidly during the day with distention and regurgitant vomiting becoming fecal in the afternoon, associated with sweating, prostration, and rise of pulse to 120. Post-operative ileus was diagnosed and interference decided upon.

Second Operation. 5.50 P.M., January 21. Gas-oxygen anesthesia. Wound reopened, coils found distended and agglutinated by fibrinous exudate associated with considerable bloody fluid. The several points of anastomosis were inspected and found competent, the segments of intestine between and above them were also distended and gas passed freely through the buttons when the bowels were compressed, but there was comparatively little filling of the ileum beyond the lowermost anastomosis though it was not collapsed. The loop of jejunum immediately above the first joint was clamped, a Mixter tube inserted through a small incision and retained by double purse-string sutures. Drains were inserted in the lower angle of the wound which was rapidly closed by mass sutures, the restoration of the bowel to the cavity being facilitated by the escape of gas and fluid contents through the Mixter tube. Post-operative condition fair.

PROGRESS.

January 22—Continued vomiting, tube not functioning. Lavage with warm saline solution through the tube brought away much fecal material.

January 23—During the night 32 ounces drained through tube and escape of gas was frequent, distention was greatly relieved, general condition much improved with cessation of vomiting.

January 23—Distention subsiding. There is leakage of yellowish fluid about tube and redness of stitch holes below. Culture taken at second operation reported "profuse growth of streptococci."

For the next four weeks the fistula drained freely into the dressings with digestion of the skin and separating of the skin edges along most of the incision. Patient became very discouraged, suffering much from the skin irritation and wasting from loss of food through fistula. In the meantime, however, passage of gas and feces by rectum became established, retraction of the belly succeeded the distention.

Third Operation. February 20; gas-oxygen. Upper three inches of old wound reopened, edges of gut identified and dissected free from overlying tissues for about an inch in all directions. Edges of gut refreshed and closed by three rows of fine silk very carefully applied and covered in with an omental flap. Skin drawn together by three mattress sutures of silkworm gut. Post-operative condition as good as before.

PROGRESS.

Patient brightened up immediately he began to retain his nourishment, appetite developed rapidly. March 2—forty-third day—he passed the three Murphy buttons. The skin rapidly cleared up, the wound healed and he was discharged well March 7, the forty-eighth day.

The illustrations show the location of the bullets and to some extent the progress of the Murphy buttons.

While the possibility of recovery after very long resections is well established it is also well established and must be constantly remembered by operators that the loss of an undue length of small intestine is productive of "indigestion" not merely, but actual malnutrition, from impaired assimilation of fats and proteids—in degree depending upon the amount of gut sacrificed. This aspect of the problem does not

FIG. 1 shows resected portions, somewhat shrunken from the preserving fluid.

FIG. 2 shows x-ray taken on twenty-fifth day. Murphy buttons dispersed.

make as pleasant reading as does the story of a brilliant operation, but some at least find their way into the literature. Dr. Codman[1] with his customary frankness has recently told the later history of one of his cases in which the successful resection of eight feet was followed by gastric tetany and wasting. We cannot often safely subordinate the physiological needs of the economy to the mechanical possibilities, and the old rule to save as much as possible of an injured member must be the guide where experience and the particular rules of surgery do not cover the situation. Here I find comfort in the words of Webb and Milli-

gan,[5] who, though advocating a single resection qualify their advice thus: "Should there be over two feet in between the resections then it would be better to perform the two; under two feet we think it better to remove the intervening foot or foot and one-half of healthy bowel." This at least affords a working guide and is in practical agreement with Senn's rule limiting the amount of small intestine safely removable to one-third its length.

Fig. 3.—X-ray taken on forty-third day. Buttons probably in rectum. They were passed later in the day. Bullets near right hip.

Next to the immediate dangers of hemorrhage and shock comes that from toxic absorption which ensues when there is obstructive or paralytic distention of the upper bowel. The effect of trauma to the intestine is paralysis, with resulting distention of the portion proximal to the injury even though there be no actual mechanical obstruction—a condition to which Owen Richards[9] applies the term "functional block." To this paralytic condition the operative trauma and the relative constriction incident to the anastomoses contribute. The advent of peritonitis, even though mild, completes the blockade and the fate of the case in which one is unable to quickly and successfully combat this paralysis is sealed. Fortunately the recognition and proof by many workers[18, 20, 21, 22, 23, 28, 31] of the particular toxicity of the contents of the duodenum and upper jejunum under these circumstances and its relation to the fatal collapse which so rapidly supervenes, has indicated the means of relief. This lies in the performance of a timely proximal enterostomy with drainage of the upper bowel.

The life saving value of this procedure has been demonstrated and proclaimed by so many whose words carry great weight with our profession that argument of mine is superfluous. For example, Charles Mayo[10] says that it is as much an operation of necessity as is tracheotomy. I therefore would content myself with urging, not its justification as a last resort, but its employment in season to prevent the arrival of the patient at the extremity where the margin of vitality in the gut is so reduced that peristalsis may not be restored. It will be observed from the protocol that immediate relief was afforded my patient when the enterostomy, done about the 66th hour, began to functionate. There can be little doubt that the outpouring of poisonous retained contents of the duodenum and jejunum with subsidence of the distention, saved him from immediate death.

It is my contention that if this expedient can be of so much value when undertaken as a forlorn hope for the relief of a condition already established it should be of much greater service if applied in the beginning. Relieving distention and stasis before the stage of toxic absorption develops seems to me as rational as putting money in the bank, and furthermore, by putting the distal, wounded portion of the bowel at rest, thus relieving the anastomoses of tension, both the local healing process and the general defensive reaction of the peritoneum will be favored. It is not necessary to defer the closure of the fistula four weeks. If one can take the time to put in a provisional purse string of silk, it can be drawn up after the tube comes out, or the special techniques of Long or Coffey may be followed. In this contention I find that I am not alone in principle; Major Gordon Taylor[12] successfully practised primary or prophylactic cecostomy in his cases of resection for severe wounds of the colon and rectum. William Mayo and others utilize appendecostomy and like expedients for gas vents in their colon resections. Of course it is more difficult to make a secure anastomosis in the large than in the small bowel and the expedient of a fistula is less troublesome to skin and nutrition when from the colon but if either will save a case from disaster it surely is a small price to pay.

In conclusion I would summarize the lessons I derive from this case as follows:

1. In cases of severe traumatism to the in-

testine multiple resections are possible and to be utilized where a single resection would deprive the patient of an undue amount of bowel.

2. In such cases where the paralytic ileus has begun or its supervention is to be clearly anticipated, primary enterostomy proximal to the traumatized area, is theoretically indicated.

3. In cases of post-operative ileus enterostomy should not be too long deferred. Its proven value entitles the patient to its benefits without waste of time on less efficient measures which indeed it supplements rather than supersedes.

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DISCUSSION.

DR. HOMER GAGE, Worcester: Dr. Hunt has presented an interesting case in an interesting way and is to be congratulated on his success.

Gunshot wounds of the abdomen naturally divide themselves into those in which the intestines are injured and those in which the intestines escape injury.

In the latter case the problem is simply as to whether operation is necessary at all, and its consideration does not come within the province of this discussion.

When the intestine has been injured but the mesenteric border is not involved, simple suture is usually sufficient, and in case of multiple injuries is the operation of choice, even at the risk of some narrowing. It lessens the danger from shock, tides the patient over his immediate danger, and if narrowing occurs the trouble may be remedied later with relatively greater chance of success.

If the mesenteric border has been involved, resection becomes necessary, and if the mesentery is involved in several places multiple resections must be done or a simple resection including all damage becomes necessary.

It is obvious that if too long a loop is involved its removal is attended with after effects that cannot be remedied. Perhaps Dr. Hunt's rule, of not including over two feet in a single resection, is as good as any. Where the perforations of the mesenteric border are far apart, multiple resections must be the operation of choice.

I was interested in Dr. Hunt's secondary jejunostomy. At a recent meeting of the American Surgical Association, Dr. J. E. Summers, in an article on "Acute Intestinal Obstruction," advocated jejunostomy as a first-stage operation in those late cases which so often present themselves at our hospitals with regurgitant vomiting, and so much distention that physical diagnosis is quite impossible.

We are all familiar with these desperate cases and the high mortality which is often increased by anesthesia and prolonged search for the seat of the obstruction.

Dr. Summers proposes that instead of hunting through the abdomen for the cause we should make a small high median incision,—identify the jejunum and put a tube in it. Whenever these cases present a condition of reversed peristalsis, and they often do, an immediately effective drainage is secured, and much more effective than drainage at the other end of the stream would be.

Dr. Summers reports excellent results from his procedure and it is interesting to find confirmation of its efficiency in the case of Dr. Hunt.

DR. F. H. WASHBURN, Holden: I should like to say just a word preliminary to my feeble and brief attempt to discuss this paper. You have listened to an essay by a gentleman who bears the name of director of surgical services in one of the largest hospitals of the State. You have had the benefit of the discussion of the paper by a gentleman who is conceded to be the leader of the surgical profession in his part of the state, a man of state-wide and nation-wide reputation; consequently how can I, a mere country town surgeon but feel somewhat in the position of one of two certain skunks.

Two skunks were wallowing along the country roadside, when there swept past a huge

motor car, leaving in its wake a malodorous vapor, the product of the combustion of gasoline and oil. One of the skunks turned to his companion with a knowing wink. The latter looked up and said, "Oh, what's the use!"

There has not been anything in my career which entitles me to say much on multiple resections. My superficial search of the literature on the subject has not revealed much, and I shall have to discuss the thing from the general standpoint of anastomoses.

Of course, the conventional thing is to congratulate Dr. Hunt on the excellent result of his very serious and interesting case, and I am sure I am glad to do that for that was some operation. It is interesting to observe what a tremendous amount of operating can be done on the intestines and still have the patient get well. Eighty per cent. of the small intestine may be removed, and the patient recover. We know that something like 18 feet of the small intestine has been removed at one sitting, and the patient has gotten well, and possibly he may have had a Murphy button to take home with him as a memento. It may be getting off the subject to speak of the large intestine, but the large intestines have been removed *in toto* a great many times for intestinal stasis. Of course it took splendid technique and great skill, and it seems to me the death rate must have been rather high.

The time was when a man went into a surgeon's office and complained of a few symptoms, among others constipation. If a diagnosis of intestinal stasis was not made he was fortunate, and if he got away with anything more than an esophagus and the lower end of the sigmoid he was fortunate indeed. Now the pendulum is swinging the other way, and I should like to push it.

One point emphasized by this operation, besides those which have been brought out, it seems to me may be this. If some of us go home and find a patient with seven kinks, let us not conclude that because somebody up in Worcester got away with those resections the thing for us to do is to remove those seven kinks by multiple resections. I believe there is an indication for this heavy surgery of the intestinal tract, a positive indication where something is necessary to save life. Then let us balance our judgment as best we may, and if we don't win out we will have the satisfaction of having done the best we can. And of course if we do win, it is a grand and glorious feeling, justifying a man for living, and neutralizing some of his previous misdeeds. I do not know that the essayist had any misdeeds,—being a surgeon, of course he must have,—but the fact that a member of the profession can bring human life from the very brink of the grave by a procedure of this kind, is certainly very remarkable.

I recently had a resection which I did in emergency, and I wish now that I had known something of the procedure of which Dr. Gage spoke, of putting a tube into the jejunum.

Dr. D. F. Jones, Boston: Dr. Hunt's report is excellent and the case a brilliant one. Dr. Hunt did not tell us the length of time elapsing between the injury and the operation, which is of the greatest importance. The high mortality in abdominal wounds in the A. E. F. was at least partly due to delay in getting them to the hospitals quickly enough.

In regard to the enterostomy which was done for the relief of the distention, this is one of the most important principles in intestinal surgery. Instead of a Mixter tube, however, I prefer a catheter put into the bowel by the Witzel method. It is simply and quickly done and allows gas and liquids to escape rapidly enough to relieve the patient. This avoids leakage from the bowel into the wound and onto the skin, and when the necessity for drainage is passed, the tube can be withdrawn without leakage from the bowel.

Jejunostomy in obstruction, as suggested by Dr. Summers and referred to by Dr. Gage, seems rational, and an analogous procedure is a caecostomy in obstruction in the sigmoid. This gives relief and is of great advantage if a resection is to be done later.

In a suture of the intestine, I believe that catgut has a great advantage over silk. A continuous suture of catgut can be put in rapidly and without fear of stricture later, for the catgut absorbs and allows the bowel to dilate, while a continuous suture of silk or linen remains and causes a cicatricial band about the bowel because it acts as a foreign body.

In any intestinal anastomosis, an enterostomy by the Witzel method above the line of suture is an excellent safety valve, and gives the greatest relief to the patient from distention and to the surgeon from worry about the line of sutures if the patient becomes distended.

Dr. Lincoln Davis, Boston: I find myself in absolute accord with what Dr. Hunt has said in his conclusions, and certainly his result was a very brilliant one. I think, however, that ordinarily with bullet wounds, resections will not be required. With a perforating bullet wound, in the majority of cases, you are able to turn in the rent and suture.

It should be emphasized that in these cases of perforations of the intestine by bullet wounds a thorough search of the intestinal canal should be made. Of course there is a certain amount of shock connected with running through the whole length of the intestine. However, if you don't make a complete search you are likely to overlook a perforation. I remember a case where a thief grappled with an M. P. The latter got out his automatic and shot the man seven times. He had a large number of perforations of the intestine, which were closed, but he died. At autopsy it was found that a perforation of the rectum was

overlooked. You have to go through the whole length of the canal to be sure you have closed all the perforations that exist.

In regard to doing an enterostomy in cases of obstruction without exploration of the lesion, it seems to me that only exceptionally is it well to do that. I must say that I want to get some idea of what the lesion is, and where it is located, before putting in my enterostomy tube. If you can locate the lesion and find out its nature, it is going to help you very much when you come to your second operation.

DR. ERNEST L. HUNT (closing): I have nothing further to add, except that if I have rightly interpreted what I have read on the subject, enterostomy is a very old operation. It was successfully done as far back as 1787. In 1840 Nélaton popularized it, and it bore his name for a number of years. In the older surgeries considerable space is devoted to it. The conservative of today was the radical of yesterday. Somebody came along and did a resection for ruptured intestine, cleaned up the peritoneum, closed up the abdomen and got away with it and from that time the use of enterostomy began to decline. A step forward to our better technique had been taken.

In the past eight or ten years there has been a lot of work done on the toxic substances found in the obstructed duodenum. Dr. Fred Murphy did important work in this field, and there are many others. There is controversy over what the toxic substance is. Dragstedt and his coworkers say that it is a split product of proteid, due to bacterial action. Whipple considered it to be a proteose. The point is that it is what kills, it is the thing to get rid of, and that is the reason that jejunostomy does the trick.

RESULTS OF CHOLECYSTECTOMY WITH PARTICULAR REFERENCE TO DILATATION OF THE COMMON DUCT.

BY JOHN HOMANS, M.D., BOSTON.

[From the Surgical Clinic of the Peter Bent Brigham Hospital.]

THE work of Judd and Mann in 1917 recalled attention to the anatomical changes which follow removal of the gall-bladder. These changes had long been known from the experimental standpoint but their clinical significance had been neglected. It is unnecessary at the present time to adduce proof that loss of the gall-bladder causes dilatation of the biliary ducts outside the liver. This dilatation was first discovered by Oddi in 1885 and since that time various physiologists have been able to furnish an explanation, if not of the function of the gall-bladder, at least of the changes which follow its loss.

It may, then, be confidently stated that the presence of a sphincter muscle at the lower end of the common bile duct prevents the flow of bile into the duodenum under normal fasting conditions; that the sphincter is capable of resisting the pressure of the bile as secreted by the liver; that the sphincter relaxes and allows the bile to escape into the intestine under the influence of the ingestion of food and of certain chemical substances placed in the duodenum; that this control is a reflex one following the law of "contrary innervation," which allows for the relaxation of a tube behind the sphincter when the latter is closed and for the relaxation of the sphincter when the tube contracts to expel its contents: that the gall-bladder fills with bile during a fast, adds mucus to the bile, and empties coincidently with relaxation of the duodenal papilla. Thus the gall-bladder, although it is capable of holding only a very small percentage of the bile secreted in twenty-four hours, aids in maintaining the intermittent flow of bile into the intestine, and the loss of this function is sufficiently important to cause dilatation of the biliary ducts behind the sphincter when the gall-bladder is removed. With dilatation of the ducts there finally occurs a relaxation of the sphincter so that in the end not only are the ducts dilated but the tone of the sphincter is lost and bile pours continuously into the duodenum.

Although cholecystectomy induces these changes, there is nothing to show that they have any pathological significance. Indeed, so many patients have enjoyed for years perfect health, following removal of their gall-bladders that there can be little question of the harmlessness of the loss of this organ. On the other hand, instances of failure to cure by cholecystectomy symptoms supposedly referable to disease of the gall-bladder have led a number of surgeons to feel that, while cholecystectomy may be harmless as an operation of necessity, it may fail to be curative as an operation of choice.

It has seemed possible that some light might be thrown upon the results of gall-bladder removal, especially in relation to the duct dilatation which follows, by studying, not only the results of a considerable series of cholecystectomies, but also the operative findings, with especial reference to the condition of the common

duct at the time the operation was performed. For, if the complete loss of function of the gall-bladder within the body is equivalent, as it would appear to be, to cholecystectomy, one would expect to see, in the presence of a functionless gall-bladder, the same changes in the common and hepatic ducts as are presumed to occur following its removal.

It was planned, therefore, in going over a series of some 250 cases at the Brigham Hospital,* to discover, if possible, whether the ducts were dilated in the presence of an obvious loss of the normal function of the gall-bladder, and whether any particular symptoms corresponded to this condition. It also seemed desirable to know whether there was any difference between the future of a person whose gall-bladder was removed in the presence of ducts already dilated, and that of another whose ducts at operation were obviously normal. It was realized that, since the investigation covered a series in which operations were performed by a number of different individuals whose standards of the normal and abnormal might well have little in common, the results of such an investigation would have to be interpreted in a very broad way, even though the cases in which the operative findings were at all uncertain were rigidly excluded. Allowance is made for this personal equation in the answers to the questions propounded.

Before proceeding to these answers it would be well to know what are the immediate and remote results of gall-bladder removal in the whole series. By immediate results I mean, of course, the operative mortality, which proves to be 5.4% in 223 gall-bladder removals, from January, 1913, to January, 1919. It makes no distinction between operations upon the gall-bladder alone and those which include common duct exploration and drainage. By remote results I refer to the operative cures and failures in respect to the symptoms for which operation was performed, as interpreted several years after operation *by the patients themselves*. Few of these patients have been followed longer than four years; some not longer than one and one-half. Probably five years should elapse before results can fairly be judged, but in a shifting city population the criteria here employed for estimating cures and failures are satisfactory enough

* The operations in this series were performed by Drs. David Cheever and John Homans of the Visiting Staff, and Drs. Emil Goetsch and Conrad Jacobson, formerly of the Resident Staff.

Of the 223 patents subjected to cholecystectomy, 12 died in consequence of the operation. Of the remaining 211, 46 have not been traced, leaving only 165 patients among whom the percentages of successes and failures can be established. Of these, six have had recurrences and may be called failures, 32 are improved but still suffer from symptoms more or less similar to those for which operation was performed, and the remaining 127 patients (77% of the traced cases) can be considered well as regards the cure of complaints directly or indirectly referable to the gall-bladder and biliary passages.

THE OCCURRENCE OF DILATATION OF THE COMMON AND HEPATIC DUCTS.

In order to study the occurrence and symptoms of common duct dilatation, the series has been divided into classes according to the operative findings. It seemed to me fundamental that if removal of the gall-bladder causes common duct dilatation, the duct should be found dilated when there was clear evidence at operation that the gall-bladder had been long out of function, and should not be found dilated in the presence of a functioning gall-bladder. This proved, in a general way, to be the case. Among forty-six patients in whom the gall-bladder* was completely out of commission the common duct† was definitely dilated in forty, while in six it was described as normal in size. In a little more than half of the forty with dilated common duct, stones were found in the duct, but in the remainder—eighteen, to be exact—no stones were discovered. Most of these ducts were actually opened in search of stones, and the operator was struck by the fact that none were to be found. I should not care to contend that stones in the common duct do not account for its dilatation. Evidence that a functionless gall-bladder calls for duct dilatation lies rather in the small proportion of normal ducts found with a contracted gall-bladder. There is one instance which illustrates the course of the dilatation. Surgical, 1911; long history of

* It was very difficult to determine whether or not a gall-bladder was functionless. Descriptions such as "contracted tightly on a mass of stones" or "the gall-bladder was a hard nubbin" were conclusive. The pathological reports were always consulted. In general, if the gall-bladder was said to contain bile, it was held to be functioning, however many stones might be present, since its expansile properties could not then be denied. The error of interpretation is probably in the direction of calling many gall-bladders "functioning" which probably were not.

† In determining whether or not a duct was actually dilated, definite descriptions of size were, for the most part, followed. Statements like "the size of my thumb" or "admitted the forefinger" were considered final. When one operator's standards seemed consistent the fact that he described the duct as dilated was considered sufficient. The descriptions of stones removed from the ducts were often corroborative.

cholecystitis characterized by attacks of sudden sharp pain below right costal border radiating to back below right shoulder, without jaundice; first operation October 17, 1914, drainage of gall-bladder with removal of stones; the gall-bladder was functioning, the common duct normal. Recurrence of symptoms, attack exactly similar to previous ones; second operation July 18, 1916; gall-bladder thick, solid, small, contained new formed stones, evidently not functioning; common duct dilated, contained no stones, drained; gall-bladder removed. Result, two years later, reported "that she never felt better." In this case, as in the others in which no stones were found in the dilated common duct, one may believe that a stone had been present and had recently been passed, but the evidence, as in this case, is all the other way. Here, the dilated common duct is clearly no bar to perfect health.

There are several other ways of getting at the relations between gall-bladder function and common duct dilatation. There should be few cases showing a functioning gall-bladder and dilated common duct. I find eighteen of these in the whole series—rather more than are consistent with the hypothesis under investigation. But of the eighteen cases, ten were found to have common duct stones, which of themselves might account for the dilatation. Of the remaining eight, three had been jaundiced at various times, which suggests duct obstruction whether or not stones had ever been present. The remainder are unexplained.

Up to this time I have spoken only of the cases in which the gall-bladder had apparently been functionless for a long time. There is a large division of the series, principally of acute and subacute cholecystitis, in which the evidence by symptom and at operation showed that the gall-bladder had recently become functionless* (stones impacted in the cystic duct and similar conditions). Of the forty-nine cases of this character, eighteen were found to have dilated common ducts, while in twenty-seven the common duct appeared normal. If dilatation habitually lags some weeks behind cholecystectomy (or loss of gall-bladder function), one would expect about this proportion when the loss of function has clearly been recent, but one would equally expect to find, among the instances of dilated ducts, many without stones. Indeed, among the eighteen, common duct stones were found in seven, none in eleven.

In order to be scrupulously fair in interpreting these observations, I have had to exclude all cases in which the operative account is unsatisfactory. To illustrate, I found thirty-nine cases in which the gall-bladder was clearly functionless and twenty in which it was functioning, with no conclusions in either instance as to the size of the common duct, and fifteen cases in which no conclusions could be drawn as to the function of the gall-bladder whether or not the ducts were enlarged. Leaving such cases out of consideration, it appears to be true that, as a rule, loss of function of the gall-bladder is accompanied by dilatation of the extrahepatic ducts: and that these ducts rarely dilate, in the absence of common duct stones, when the gall-bladder is functioning. It may even happen that duct dilatation *precedes* the appearance of stones within the common duct. For if the common, hepatic and *cystic* ducts dilate in the presence of a functionless gall-bladder loaded with stones, the dilatation would obviously encourage the escape of stones from the gall-bladder into the ducts.

SYMPTOMS.

There remains to be considered the possibility of a symptom complex associated with dilatation of the common duct, apart, of course, from the jaundice which accompanies the dilatation of actual obstruction. Before touching upon this question I must admit that I know of *no* symptoms definitely diagnostic of disease of the common duct as distinguished from the gall-bladder. In a general way, jaundice is the most reliable indication, yet attacks of acute cholecystitis may be accompanied by infection within the ducts causing biliary obstruction in the absence of stone. And again, stones may be present in the ducts without causing jaundice, or indeed pain.

As to pain, a careful study of the symptoms in a long series of cases leaves one with the conviction that pain in disease of the gall-bladder and biliary passages is of the "referred" type, manifesting itself through local mesenteric connections by way of the spinal cord. Just as early appendicular pain is referred to the umbilical region, so gall-bladder or duct colic is usually referred to the back, shoulders and even down one or both arms. I will not trouble you

*Experimentally, dilatation of the duct after cholecystectomy occurs in six weeks to two months, possibly less.

with a number of histories in which the symptoms caused by gall-bladder disease and common duct stone are identical, but content myself with one in which the symptoms of common duct stone occur after gall-bladder removal.

Surgical, 11127; first admitted March 21, 1916; for four years attacks of severe knife-like epigastric pain radiating to right back and shoulder and requiring morphia; often jaundiced. Operation disclosed a "nubbin" of gall-bladder, which was removed, and a large common duct in which no stones were found. No further attacks until three years later. Recurrence of attacks; epigastric pain radiating along right costal margin and into back between scapulae; jaundice. At the second operation, which has proved completely curative to date, an old facetted stone was found in a huge common duct, the size of one's thumb. Here is fully described pain due to common duct stone. There is no possible confusion with pain attributable to the gall-bladder, and yet I could quote history after history of pure gall-bladder disease with pain of identical character. As regards pain, then, there are no symptoms characteristic alone of a common duct lesion.

The gastric symptoms so characteristic of disease of the biliary apparatus seem likewise to play no favorites. "Indigestion," attacks of vomiting, gaseous distention, etc., are found familiarly with all sorts of lesions of the gall-bladder and ducts. Indeed, being reflex in character they appear with disease in almost any part of the upper intestinal tract and its appendages.

It may be judged, then, that it will be difficult to distinguish symptoms due to bile duct dilatation *per se*. Possibly light may be thrown upon this subject by examining the post-operative results in patients whose ducts are known to have been dilated at the time of operation, and by comparing the symptoms before and after cholecystectomy in the group of patients whose ducts at operation were of normal size, but presumably have since dilated.

In the first group (those whose ducts were found dilated at operation) are found 81 cases. Cholecystectomy was performed in all and resulted in a mortality of 6.2% (5 deaths). Of the surviving 76 patients, 19 cannot be traced; two have definite recurrence; eight are improved but suffer from some of their previous symptoms; and 47 (83% of the traced cases) are well one and one-half or more years after operation. Whether or not this is a reasonable percentage of cures, it is apparent that in the majority a dilated common duct is no bar to a return to health.

In the second class (those whose ducts were of normal size at operation but presumably have since become dilated) are found 92 cases. Cholecystectomy was performed in all and resulted in a mortality of 1.1% (one death).* Of the 91 surviving patients, 21 cannot be traced; one has definite recurrence; 18 are improved but suffer from some of their previous symptoms; and 51 (73% of the traced cases) are well. Here there is a somewhat lower percentage of complete cures, but in no patients of this class have new late symptoms suggestive of disorders related to dilatation of the ducts appeared.

These investigations show, then, that dilatation of the ducts presents no characteristic symptoms and is not an adverse influence preventing a cure after cholecystectomy, nor are any new symptoms discoverable as a consequence of the duct dilatation which cholecystectomy may be expected to produce. These findings do not deny the existence of nutritional disturbances which may be occasioned through alteration in the secretory pressure of the liver cells which relaxation of the ducts and the sphincter may well bring about. At present there are no tests of liver function available to determine such matters.

As to other possible by-effects of duct dilatation, it may be suggested that stone formation within the ducts is encouraged. Against this possibility is the experimental evidence that dilatation is succeeded by relaxation of the sphincter at the papilla of Vater and that the flow of bile is thereafter continuous. This would tend to prevent stagnation of bile and discourage stone formation. In this connection Judd has called attention to a group of patients who have noted the passage of large amounts of bile from the bowels after cholecystectomy, a symptom which has not persisted. It has not been observed in this series. Another possible complication might conceivably follow duct dilatation and sphincter relaxation. I refer to regurgitation of the duodenal contents into the ducts. Against infection from this source is the fact that the duodenal contents are notably

* The cause of the higher mortality in the first class, as opposed to the low mortality in this, is clearly due to the increased danger of operation upon the common duct.

free from bacteria. There may, however, be a real danger from self-digestion by activated pancreatic juice, or from invasion of the ducts by intestinal parasites (as suggested by Judd and Mann).

Finally, I should like to say a word as to the border-line cases in which cholecystectomy would seem to have a doubtful value, cases of mild chronic cholecystitis with or without stone, in which the gall-bladder is presumably functioning, the common duct normal. To this class belong most of the neurasthenics and persons with reflex intestinal disturbances for which exploratory operation is proposed. Surgeons may be justified in feeling that they are doing unnecessarily radical operations and perhaps actual harm by removing the gall-bladder in such patients. While it would be foolish to say that such cholecystectomies are harmless or that accidents usually due to inexpert surgery are not likely to occur, it just happens that into the category described above there fall 52 cases in the Brigham series, with an operative mortality of zero. Thirty-eight had stones; fourteen did not. None, as far as the traced cases show, were made worse by operation. But among these patients is found the highest percentage of incomplete cures as compared with the patients who consider themselves well. Of the 52 patients, 12 were untraced; one was completely unrelieved; 15 (37.5% of the traced cases) are more or less improved; and 24 (60% of the traced cases) are well. Thus we are not getting satisfactory results from our treatment of these patients. We need to know more about the pathology and indications for operation, but we have no reason to assume that duct dilatation is responsible for our failures.

CONCLUSIONS.

1. There is satisfactory experimental evidence that removal of the gall-bladder is followed by dilatation of the extrahepatic biliary ducts.

2. There is evidence that destruction or loss of function of the gall-bladder within the human body is frequently followed by duct dilatation.

3. There is evidence that duct dilatation occasionally occurs while the gall-bladder is functioning and in the absence of common duct stone.

4. There are no symptoms characteristic of dilatation of the biliary ducts.

5. There is no evidence that dilatation of the biliary ducts is actually harmful to the individual.

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DISCUSSION.

DR. FRED B. LUND, Boston: It has been stated in this meeting that it is customary and perfunctory to compliment the reader of a paper, but I am glad to do it in this case because I think Dr. Homans has made a thorough study of his subject and analyzed it with great care. His conclusions bear us out in what we are doing.

I remember a few years ago when I was in the medical school we learned about bile under physiology, and learned that certain animals did not have gall-bladders—the horse, the camel, the mouse, the dove, the cuckoo, and the whale, likewise the elephant and the ostrich. Those were mostly vegetarian animals as far as I can remember. Carnivorous animals have gall-bladders, which is fortunate, because that gives us the cat and dog to take for our experiments. It is evident that the purpose of the gall-bladder is for the relief of tension in the bile duct. Bile would not ordinarily get into the gall-bladder unless the tension in the bile passages was greater than the intra-abdominal tension. In order to get there it has got to run backward and upward off the main track. The tension which forces it there is maintained under normal conditions by Oddi's sphincter, and when that relaxes the tension is relieved. The gall-bladder is like a blister on a tire; it is a safety valve. It is not big enough to act as

a reservoir for bile since the amount it contains is ridiculously small compared with the amount of bile secreted every 24 hours. We all know that in animals if you tie the common duct they die quickly with multiple necroses of the liver, whereas human beings will stand biliary obstruction much longer than animals. A normal gall-bladder is just about as elastic as the ducts, no more, no less. You all know that when you have obstruction of the common duct by cancer, then you get a dilatation of the common duct and gall-bladder and when you feel the distended gall-bladder and ducts you find that the walls are all just about the same thickness so that one will dilate as soon as the other. In the removal of the gall-bladder, which extends the elastic area, it is perfectly natural that the common duct should dilate at once.

Another thing that I know has been observed experimentally about the dilatation of ducts is that, after the gall-bladder has been removed and the cystic duct tied close to the gall-bladder, in certain cases dilatation in that cystic duct has taken place so as to make a sort of second-hand gall-bladder. This must be the result of normal pressure of bile. Both infection in the gall-bladder and the presence of stones cause inflammation, and in an unsupported round body like the gall-bladder it contracts till it gets down to a little bit of a nubbin on the side of the duct, and then you usually find a common duct stone; but Dr. Homans has demonstrated that under those circumstances you may find simply a dilated duct. It is very difficult to say whether all the dilatations that you get where the gall-bladder has been out of commission are due to dilatation consequent on removal of the gall-bladder, or to the presence of stones. The presence of stones in the common duct may have caused that dilatation, and the stones afterwards passed so that they were not found. For that reason I don't feel that Dr. Homans has quite proved his case, although no doubt he is probably right. At any rate it does not make much difference.

In these cases we have always got to open the duct and if we don't find stones, then we have done no great harm.

In regard to jaundice, I have found the deepest jaundice in cases where there were no stones in the common duct, but a stone impacted in the cystic duct lying against the common duct. Inflammatory swelling takes place, results in obstruction and the jaundice is very intense. I have found another class of cases where you can make a pretty good guess at the presence of stones in the duct. Those are cases of slight jaundice coming on and going away, an intermittent recurrent jaundice with chills. If a patient shows the symptoms of pain and intermittent or recurrent jaundice it behooves you to examine the common duct with special care, because it almost always means a stone that goes down and blocks the sphincter. Then you get your jaundice and chills. The very dilatation of the duct behind the stone sets it free, and it floats back.

There is a great deal that we might say about these cases, but I will say just one word more and then I will be done. I think Dr. Homans has shown what we are very glad to know, that the patients are certainly in as good health with the gall-bladder removed, and with their ducts dilated as they were under nomal conditions, *i.e.*, before the gall stones were present. If the sphincter is acting so that the bile is only poured out when the stimulus of food calls for it, we should expect patients to be perfectly well, but we might think if the bile is escaping all the time it would affect nutrition. However, we have evidence that patients with permanently dilated and thickened common ducts are perfectly well, and where, at operation, we have got dilatation and thickening we are certainly less in need of the external drainage, of which, after all, we are using less and less all the time.

Dr. George W. W. Brewster, Boston: Dr. Homans' paper is certainly most interesting and shows a good study of this sort of cases. It offers many opportunities for discussion. Dr. Lund has covered many of the points that I had intended to mention.

From a practical point of view, the question of what to do in the face of finding a dilated common duct at operation, is what we want solved. Given a diseased gall-bladder, gall-stones, or cholecystitis and a dilated common duct. What does that mean? We have been taught in the past that in gall-bladder surgery when we found an enlarged common duct that meant probably stones, whether they could be felt or not, and that exploration of the common duct was indicated simply from the presence of dilatation. In many cases it is possible to feel the stone, but on the other hand no stone could be found in many cases.

If Dr. Homans is right that the common duct can dilate without disease of the gall-bladder, without stones, it might be possible in the future to be guided somewhat in our indications for opening a dilated common duct. I don't think the fact that we don't find the stone proves that there was no stone there, or that it has not been there. However, I think we need further observations or statistics as to the presence of dilatation without stones to make one feel justified in not exploring a common duct.

Dr. D. F. Jones: Dr. Homans' paper is most interesting and instructive. I wish, however, that he could have given us some aid to determine as to whether there are stones in the common duct or not.

Dr. Brewster has told us what to do when the common duct is dilated. I agree with him that it should be explored when the condition of the

patient permits, whenever found dilated, whether the gall-bladder has been out of commission or not. It is not at all infrequent that stones are found when there are no symptoms suggesting stone in the common duct. Stones in the duct are very elusive and at times very difficult to feel, either because of their position or size. One of the great surgeons of this country asked another what he found in the common duct of a case he had operated upon twice for jaundice. The second surgeon said he had removed a stone one-half inch in diameter from the common duct, which the first surgeon had overlooked in two operations.

DR. HOMANS (closing): In regard to what Dr. Lund has said about the common duct, I quite agree with him that when dilated it is usually thickened. It is, of course, a question whether a stone may not have been present in such ducts, but the question here is whether the duct may not dilate in the absence of a stone. I may be wrong, yet I feel quite certain that ducts do habitually dilate in the presence of a functionless gall-bladder. Certainly the common duct does dilate in the absence of a stone on many occasions.

As to the diagnosis of stone in the common duct, I agree with Dr. Lund that one ought to be able to make a diagnosis in many cases.

In regard to what Dr. Brewster and Dr. Jones have said, I should never dare to maintain that a dilated common duct contained no stone without a most thorough investigation. I almost always open a dilated duct and so does every surgeon I know. However, we are all accustomed to finding occasionally that no stones are present: whether we ought to be able to distinguish a dilated duct which has no stones from a dilated duct containing stones without opening the duct, I cannot pretend in this paper to be able to say.

ACUTE INTESTINAL OBSTRUCTION: A STUDY OF A SECOND SERIES OF CASES FROM THE MASSACHUSETTS GENERAL HOSPITAL.

BY EDWARD P. RICHARDSON, M.D., F.A.C.S., BOSTON.

ADVANCES in diagnosis and operative treatment have reduced largely the mortality of many surgical emergencies arising within the abdomen. This is particularly true of appendicitis, of gall-bladder disease, and of perforations of the alimentary tract. In acute intestinal obstruction we have in most cases a mechanical condition, which it would seem possible to relieve by the mechanical measures available to surgery. Yet a proportionate reduction of mortality has not been obtained in intestinal obstruction. For this reason, it has seemed of interest to place before the Society an analysis of a series of cases, in comparison with a previous series from the same clinic, with the hope that some definite evidence may be shown of progress in the treatment of this condition.

In 1908 C. L. Scudder[1] reported a series of 121 cases of acute intestinal obstruction operated on at the Massachusetts General Hospital during the preceding 10 years, from 1898 through 1907. The present paper includes a second series of 118 cases, in direct continuation, occurring through the ten years, 1908 to 1917 inclusive. Since it is difficult to compare results from different institutions, made up of varying types of cases selected and grouped according to different systems, an effort has been made to have the present series as nearly as possible parallel to the previous one. It includes cases of acute mechanical obstruction, in which operation was demanded as an immediate necessity. All cases of chronic or partial obstruction which gave the surgeon opportunity to select the time for operation, have been excluded. All cases of strangulated external hernia and all obstructions due to tumors, intestinal and extra-intestinal, except in so far as such tumors were an exciting cause of intussusception, have been excluded. A most important question, in compiling such a series, is which of the many borderline cases should be included as acute mechanical obstruction. To this end Dr. Scudder has gone over with me certain of the doubtful cases and I wish to thank him for his assistance and suggestions.

The doubtful cases occur chiefly among those in which obstruction occurs during convalescence from laparotomy. Here the decision lies as to whether the case should be included as acute intestinal obstruction, or excluded as paralytic ileus from peritonitis. The point of view has been taken that any operation undertaken to relieve distention and obstipation by freeing adhesions or draining the bowel following laparotomy, was evidence that the surgeon felt that there was a mechanical factor in the obstruction, and such cases have in general been included in the series.

The fatalities of the series include deaths from any cause while in the hospital, whether or not a direct result of intestinal obstruction and the operation to relieve it. Two deaths occurring shortly after transfer to another institution, and possibly subsequent to further op-

eration, are not included. Nor are seven deaths included, presumably from obstruction (confirmed in three instances by autopsy) in which, for one reason or another, operation was not undertaken.

The cases are grouped as in the previous series. In many instances it is hard to decide to which group a case should be assigned, since certain cases are not sharply defined and others might be assigned to two or more classes, as for instance, a case occurring several months after operation, due to adhesions, and presenting a volvulus. Such an instance would be classed as volvulus, since from the point of view of operation and prognosis, this is the important feature of the case. The grouping must be considered merely approximate, but nevertheless brings out certain features.

Each admission is counted as one case. Three cases were admitted twice for acute obstruction, making 118 cases, but only 115 individuals, as compared with 121 cases in the previous series. These 118 cases were operated on by twenty-three surgeons, the largest number falling to any one operator was sixteen. If acute obstruction recurred during the patient's stay in the hospital, as happened in three instances, it is counted as one case, and the final result only is recorded.

Of 114 individuals, 67 were in males and 47 in females, showing the usual predominance of this condition in males. The following table of the age of patients in decades is given merely to emphasize the fact that a great proportion of cases, above two-thirds, occur in people of forty or under, and the consequent economic importance of the type of individual lost in deaths from obstruction. It also serves to show that the results of operation are distinctly better in children and young adults than in infants or older people.

Table I.

	Cases	Recovered	Died	Per Cent. Mortality
Under 1 year	11	3	8	72.7%
1—10 years	6	5	1	16.6%
11—20 "	25	18	7	28.0%
21—30 "	15	13	2	13.3%
31—40 "	27	12	15	55.5%
41—50 "	10	6	4	40.0%
51—60 "	11	5	6	54.5%
61—70 "	9	4	5	55.5%
71—76 "	3	2	1	33.3%

Table II shows the general results of operation for the series in comparison with C. L. Scudder's previous series. The general mortality of 41.5% in 118 cases operated upon, as compared with a previous mortality of 60%, shows a drop, along certain lines particularly, but the results still are far from satisfactory. I propose to go into the different groups more in detail and from various points of view, in order to throw as much light as possible on the causes of mortality, in the hope of pointing out if possible, the lines along which further improvement may be hoped for.

The cases of early post-operative obstruction, twenty-nine in number, include acute obstructions occurring shortly after laparotomy as a post-operative complication, the time included being set somewhat arbitrarily at the first four weeks following operation, as comprising the usual period of convalescence. Obstruction occurred most commonly after appendectomy, with drainage, and next most frequently after various pelvic operations on women. Twenty cases followed appendectomy with drainage, six cases various pelvic operations on women, two cases simple appendectomy, and one resection of jejunum and closure of gastroenterostomy stoma. Obstruction developed eleven times in the first week, twelve times in the second, four times in the third and once only in the fourth week. The region involved was stated to be the small intestine twenty times, the large intestine, twice.

Table II.

Type of Cases	1898-1907. C. L. Scudder				1908-1917			
	Cases	R.	D.	Mortality	Cases	R.	D.	Mortality
Early post-operative obstruction (first 4 weeks after operation)	18	5	13	72.2%	29	22	7	24.1%
Late post-operative obstruction (developing after 4 weeks)	19	13	6	31.6%	28	17	11	39.3%
Bands and adhesions without previous operation	33	15	18	54.5%	14	7	7	50.0%
Meckel's diverticulum	9	2	7	77.7%	4	2	2	50.0%
Volvulus	9	0	9	100.0%	16	12	4	25.0%
Intussusception	27	13	14	51.8%	20	8	12	60.0%
Mesenteric thrombosis	1	0	1	100.0%	5	1	4	80.0%
Congenital anomalies	2	0	2	100.0%				
Stone in gut	1	0	1	100.0%	1	0	1	100.0%
Internal hernia	2	0	2	100.0%	1	0	1	100.0%
Total	121	48	73	60.4%	118	69	49	41.5%

In regard to treatment, these cases represent rather a special class, in that the obstruction is ordinarily due to recent inflammatory adhesions, possibly assisted by local paralysis of the bowel from sepsis, with the result that the obstruction is of a temporary rather than of a permanent nature, and so differs from obstruction due to firmly organized cicatricial bands and adhesions. Under these conditions I have felt, as pointed out in a previous communication,[2] that enterostomy without exploration was a more favorable means of treatment in this than in other forms of obstruction. In this series separation of adhesions under a general anesthetic was the usual method of treatment. This was done in eleven instances with eleven recoveries, but the obstruction recurred in three cases. Separation of adhesions resulted in a tear of the bowel once, and such damage as to require resection another time. Enterostomy or colostomy alone was done in eight cases with seven recoveries and two secondary operations for closure of the fistula. Separation of adhesions with an enterostomy or caecostomy added was done in eight cases with six deaths. The danger of overlooking a strangulated loop by doing an enterostomy under local anesthesia without exploration is not great, as only one case (included under volvulus) gave evidence of strangulation. The conclusion which I should draw from these facts is that if the condition of the patient is such, in early post-operative obstruction, as to appear to make drainage of the bowel indicated, it is best done under a local anesthetic without exploration or separation of the adhesions causing the obstruction.

The drop in the mortality over the previous series, from 72% to 24%, is marked and shows the importance of close observation and early intervention, ordinarily within forty-eight hours, when symptoms of obstruction develop. The deaths of this series are perhaps more chargeable to the original sepsis than to the obstruction. Five of these seven deaths came to autopsy. Three showed peritonitis, one septicemia and thrombosis, and one an empyema and lung abscess. Improvement in results in this class of case depends more on early diagnosis of the original conditions and care in technique during the primary operation than on other factors.

The second group, late post-operative obstruction, twenty-eight in number, followed laparotomies at periods varying from six weeks to fourteen years and were due to peritoneal adhesions presumably a result of the previous operation. Nine cases developed within the first year, three in the second, four in the third, and two in the fourth. The original operations were similar in type with those of the first group. The primary operation was appendectomy in fifteen instances, seven times stated to have been with drainage; various pelvic operations in women in ten instances, intestinal anastomosis twice, and reduction of intussusception once. Obstruction occurred in the small bowel in the cases in which its location could be determined, and resulted in strangulation of the bowel six times in twenty-eight cases. The mortality shows a slight increase over the previous series, from 31.6% to 39.3%.

Bands or adhesions without previous operation were the cause of obstruction in fourteen cases, as compared with thirty-three in the previous series. They present a similar type of obstruction to the preceding class, being due in most cases to peritoneal adhesions of inflammatory origin, more rarely to congenital bands. Obstruction occurred in all cases but one in the small intestine, and showed strangulation of the bowel four times, or in about an equal percentage of cases. The high mortality, 50% in this series, 54% in the previous one, I should attribute to the absence of an abdominal scar, which serves as an important clue pointing to obstruction as a cause of symptoms in doubtful cases. On account of more difficult diagnosis, it is probable that these cases came to operation somewhat later.

Meckel's diverticulum was the cause of obstruction in only four cases. Obstruction is complicated in these cases by the tendency of the diverticulum to necrose and perforate. The treatment was amputation of the diverticulum and freeing the bands and adhesions causing the obstruction. In one fatal case the extent of the necrosis of the diverticulum made resection of the bowel necessary. The mortality, although the cases are few, shows improvement from 77% to 50%.

Under volvulus are included all cases in which definite torsion of the intestine and its mesentery produced acute obstruction. The volvulus affected the small intestine eight times, the caecum and ascending colon five times, and the sigmoid three times. Volvulus of the caecum was possible in these cases from abnormal

mobility of the caecum and ascending colon, amounting in one case to a marked congenital anomaly. In one instance, operated on two days after resection of a loop of small intestine for strangulated femoral hernia, a twist of the whole small intestine was found. The usual operation was reduction of the twist, in five instances with an added caecostomy or enterostomy. Only twice was resection necessary, with one death and one recovery. The mortality shows a marked improvement from 100% to 25%.

The cases of intussusception, twenty in number, show an increase in mortality from 51% to 60%. Eleven of these occurred in infants, of whom eight died. All these infants gave a history of bleeding from the rectum, and in eight instances showed on examination an abdominal tumor, while in two other cases the intussusception protruded from the rectum. One infant, in whom intussusception recurred twice, had an intestinal tumor, and appears twice in the series, finally dying after the third operation. In all the infants the entering point was the ileocaecal valve. The ages of the remaining eight individuals ranged from eight to seventy years; only two cases were under ten. Four cases showed a definite cause for the intussusception, which was a tumor of the intestinal wall twice, intestinal ulceration once, and a diverticulum once. In one of these patients the intussusception recurred once, the patient remaining cured after resection of a segment of bowel showing multiple papillomata. In the older cases bleeding from the rectum was not noted, and a palpable tumor was observed only three times. The intussusception was in the small intestine four times, and ileo-colic four times. There were five recoveries from the nine operations.

Reduction of the intussusception was possible in seventeen cases, with nine deaths. Of these, in one recovery the bowel was fixed to prevent recurrence, in another already mentioned resection was performed; in a third, enterostomy was added to the reduction. In two of the fatal cases, enterostomy as well as reduction was done. In one of these cases the viability of the bowel was so doubtful that the affected intestine was left outside the wound on the abdominal wall. In the three remaining fatal cases, in which reduction was not done, in two an enterostomy was made and the intussusception was left outside the wound; in the third the bowel tore across in attempting reduction. The mortality in these cases is high and an increase over the previous series is particularly discouraging. It is hard to attribute it to any definite factor, aside from the considerable lapse of time in many cases from the onset of the symptoms to operation.

Of the cases of mesenteric thrombosis, five in number, one recovered following the resection of 60 cm. of small intestine and immediate anastomosis. This condition is apt to show a particularly high leucocytosis, amounting in one case to 97,000, in another to 35,000. Bleeding from the bowel occurred in two instances. The four fatal cases represented a condition nearly hopeless from the outset, involving in three instances the small intestine and in one the large. Two cases which came to autopsy, one after resection, and the other following the lateral anastomosis and exclusion of the affected bowel by leaving it outside the wound, showed extension of the process over additional areas of the small intestine. The other two cases showed a diffuse process, one involving the small intestine, the other a great part of the large bowel. In the first an exploratory incision only was done, in the second an enterostomy was made, and as much involved large intestine as possible was left outside the wound. The occasional brilliant result from extensive resection is the only redeeming feature of an otherwise hopeless condition.

The two remaining cases, obstruction of the jejunum from a gall-stone or faecolith in a woman of seventy-one, and a man of twenty-six with hernia through the root of the mesentery of the small intestine, requiring resection of four feet of small bowel, were both fatal.

On account of the marked importance of interference with the blood supply to the bowel in intestinal obstruction, as shown by various experimenters, notably Murphy and Vincent,[3] it has seemed worth while to group the cases along another line, those which showed definite interference with the circulation of the mesenteric vessels, as cases of strangulation and volvulus, and those which had no evidence of such interference. The cases of intussusception have been omitted from this grouping, as being somewhat intermediate between the two classes. Of the cases without obstruction to the blood supply of the bowel, sixty in number, forty-two recovered and eighteen died, a mortality of 30%. Of thirty-four cases with interference to the blood

supply, seventeen recovered and seventeen died, a mortality of 50.0%. In eleven of these cases, with strangulation of the bowel, resection was necessary, with seven deaths, a mortality of 63.7%. In four others resection was indicated but could not be carried out. In four cases it is doubtful whether or not strangulation existed. Of these two died and two recovered. These figures confirm well recognized clinical and experimental facts. It is well to note however, that the extreme distention of late acute obstruction produces marked interference with the circulation of the bowel wall, through stasis and congestion, without obstruction of the circulation of the mesentery.

A conspicuous feature in operating for acute obstruction is the occasional presence of blood-stained serum in the peritoneal cavity. Since this feature has some importance as a sign of strangulation, it has seemed worth while to analyze the cases in which it was noted. Of twenty-four cases with bloody serum, fifteen died, a mortality of 62.3%. In twenty cases the bloody fluid accompanied strangulation of the gut, intussusception, or mesenteric thrombosis. Bloody fluid was present in four cases in which no strangulation, thrombosis, or intussusception was found, and appeared to be the result of marked distention and congestion of the bowel. Conversely, in five cases of strangulation, three of intussusception, and one of mesenteric thrombosis, the peritoneal fluid was not bloody. When present, therefore, it demands a search for the cause of obstruction; its absence, particularly in early cases, does not exclude the possibility of strangulation.

It is a matter of common experience, confirmed by experimental evidence, that the higher the obstruction is, the more rapidly fatal. One would expect as well, a greater operative mortality, the higher the obstruction. Figures on this point are inconclusive. One hundred and three cases in which the level of obstruction could be approximately determined from the operative report, showed no marked variation according to the level of the point of obstruction.

Part of Bowel Obstructed	Cases	R.	D.	Mortality
Jejunum	8	5	3	37.5%
Ileum	28	20	8	28.0%
Small intestine (not further specified)	41	25	15	36.5%
Ileo-colic intussusception	15	5	10	66.6%
Large intestine	11	8	3	27.2%
Total	103	63	39	

Volvulus of the caecum has been included as obstruction of the large intestine, although the actual point of obstruction in such cases might well be in the ileum. The cases in which the operative reports did not specify the level of the obstruction naturally include some of the worst cases, in which operation was hurried or incomplete.

The types of anesthesia and the results are given in the following table. Anesthesia was frequently induced by nitrous oxide, as a preliminary to ether. One death, due to spinal anesthesia before operation was begun, in a case of probable obstruction, is not included in the series on account of the uncertainty of diagnosis.

Anesthesia	Cases	R.	D.	Mortality
Ether	99	58	41	41.4%
Spinal anesthesia	7	6	1	14.4%
Spinal and general	2	1	1	
Local (novocaine)	4	2	2	
Novocaine and general	4	0	4	
Gas oxygen	2	2	0	
Total	118			

The use of other forms of anesthesia than ether was too limited to draw conclusions, although the results of spinal anesthesia seem encouraging. The matter of anesthesia will be referred to later.

The type of operation employed depended on various factors, particularly the kind of obstruction, the circulation of the bowel and the condition of the patient. It is not possible from analysis of operative results to give any approximation of the value of various operations, since so many factors influence the outcome in each individual. On account of the multiplicity of operative procedures, it simplifies the situation to include them in the following groups: First, relief of obstruction only, such as separation of bands and adhesions, untwisting a volvulus, reducing an intussusception, sixty cases, sixteen deaths, a mortality of 26.6%. Second, relief of obstruction, plus drainage of the bowel, by enterostomy or colostomy, twenty-two cases, twelve deaths, a mortality of 54.5%. Third, drainage of the bowel by enterostomy or colostomy, fourteen cases, six deaths, a mortality of 42.8%. Fourth, cases requiring resection of the bowel, fifteen cases, eight deaths, a mortality of 53.3%. Fifth, operations incomplete or abandoned, seven cases, all died.

When enterostomy or colostomy was performed in this series, it was ordinarily done low, as near the probable point of obstruction as was practicable. In no case was a high enterostomy deliberately done on the basis of diminishing toxic absorption. The cases in which drainage of the bowel was done represent the bad risks, and the high mortality is no argument against the usefulness of the procedure. When resection was done, the ordinary method was to postpone anastomosis to a second stage. This was done in ten cases, of which five died before the second stage was attempted, and one was discharged. Of the remaining four, anastomosis was done in two cases at the end of two and four days. Both died. In two cases, who recovered, anastomosis was postponed for some weeks. Whether anastomosis should be done early or late depends on the level of the fistula and its tolerance by the patient, and no conclusions as to the favorable time can be drawn from these instances. In five cases an immediate anastomosis was done. Four of these survived. Two of the four cases, however, were relatively favorable. In one resection was done for damage to the bowel caused by separating adhesions, in the other it seemed advisable to remove papillomata which were the cause of intussusception. In most cases, the condition of the patient necessitated postponement of the anastomosis. It is not probable that more cases would have survived if anastomosis of the bowel had been done in the first stage. The only general conclusion to be drawn from these figures is that to get more satisfactory results, we should have more patients in the stage when simple relief of the obstruction is all that is necessary.

To sum up, analysis of a second series of cases of acute intestinal obstruction shows slight but definite progress in the results of treatment over the previous series. The mortality from operation shows a distinct drop, marked in some types of cases, slight or absent in others. The question now is along what lines we may expect further improvement. The factors most influencing the outcome of a given case, aside from variations in the age of the patient, level and cause of the obstruction, may be said to be the promptness of diagnosis and operation, the kind of anesthesia, the type of operation and the method of operating, and the after care.

Of these factors the most important is early diagnosis and early operation. The value of this is shown in the group of cases in which obstruction developed during convalescence from operation. Here, in spite of septic complications, the mortality fell from 72% to 24%, largely because obstruction developed under close observation, so that early diagnosis and operation, ordinarily within forty-eight hours of the onset of symptoms, were both possible. If reduced to figures, the value of early diagnosis and operation is hard to demonstrate. Of one hundred cases in which an approximate estimate as to the duration of symptoms could be given, the cases recovering had had symptoms for 2.6 days; those dying for 4.2 days. Forty-six cases operated on approximately during the first forty-eight hours had a mortality of 32.5%, fifty-four cases operated on after two days had a mortality of 48.1%. These figures do not bring out the true value of early diagnosis, for the reason that the individual patient was not sent to the hospital because his symptoms had lasted so many days or hours, but because they became alarming. In some cases, with definite local strangulation, or sudden complete high obstruction, such symptoms develop with great rapidity, consequently these cases come to the hospital relatively early, if at all, and at the same time are in serious condition at the time of operation. Other cases, although appearing to have complete obstruction from the outset, may take three or four days to reach an equally serious condition, and come to operation correspondingly late. From individual case reports, however, it is clear that if each particular case could come to operation sooner, operation would have stood a far better chance of success.

The most important line along which to strive for improvement, therefore, is early diagnosis. The great difficulty here lies in the absence of physical signs to confirm our suspicions of obstruction. The local tenderness, spasm, and rigidity, so helpful in the diagnosis of acute peritoneal inflammation from various organs, is ordinarily wanting. Visible peristalsis is only present as an exception in acute obstruction, although noted somewhat more frequently when obstruction develops shortly after operation. A tumor due to strangulated coils of bowel (Wahl's sign) was observed only twice. Distention may develop late, or be absent. Temperature is often normal or subnormal. Frequently, however, there is a marked leucocytosis. Except in the cases of intussusception in infants, in whom bleeding from the rectum and a

palpable tumor are nearly always present, there is little definite to aid us. We have to fall back, therefore, on the cardinal, but somewhat indefinite symptoms of pain, vomiting, and obstipation. Pain is a practically constant symptom in these cases. Its location and character are variable. It is frequently umbilical or general, sometimes epigastric, or may be assigned to some other definite location. It is frequently cramp-like or continuous with paroxysms. If strangulation of the bowel has occurred, it is intense. It is not relieved by enemata, and is usually intensified by cathartics. Accompanying the pain in almost all cases is vomiting, at first stomach contents, later the characteristic thin brown foul contents of the small intestine. Enemata at the onset may give good results, from evacuating the bowel below the point of obstruction, but do not help the pain. Further enemata are without result. The pain continues unless obscured by morphia.

Pain of this character, accompanied by vomiting, unrelieved by enemata or a reasonable cathartic, should suggest the necessity for operation, or at least for surgical observation. Further attempts to force a passage by catharsis lead to increased vomiting, to overdistention and exhaustion of the bowel and to increased toxemia. The clinical picture of a deeply toxic patient with distended abdomen, feeble pulse, sunken eyes and a brown, dry tongue, is a picture of a patient when operative treatment is of doubtful benefit. The change from a patient who seems in fair condition to one in a state where operation is hopeless, takes place with extreme rapidity. These patients are far worse operative risks than their general condition would suggest. If we wait until the patient's general condition shows the effect of obstruction, the favorable time for operation has passed. In going over this series, I was struck with the rarity of negative exploration for obstruction In a condition from which barely half of the afflicted survive, to get the best results we should have a considerable percentage of negative explorations. Operation should be based on suspicion, rather than on certainty.

If operation is decided on, the first question is anesthesia. The effect of ether is bad in intestinal obstruction. It not only paralyzes intestinal activity and so interferes with the bowel taking up its peristaltic action after operation, but may lead to inhalation pneumonia. The foul vomitus which distends the stomach may flow back through the relaxed cardiac orifice, although the patient may not actually vomit. Even if the stomach is washed out before anesthesia, it is apt to refill from the intestine during operation. In spite of its disadvantages, for practical reasons, ether, often with preliminary nitrous oxide, was the usual anesthetic in this series. The great value of local and spinal anesthesia in obstruction is shown in the results obtained in strangulated hernia, which offers a better opportunity for their use. Local anesthesia may not give satisfactory opportunity for exploration, and it is unfortunate that the field is not larger in internal obstruction. Gas oxygen was tried too little in this series to draw any conclusion as to its value as ordinarily given. It has the disadvantage in many cases of incomplete relaxation and consequent difficulty in exploration and manipulation. Aside from the uncertainty and danger of giving spinal anesthesia high enough to anesthetize the abdominal wall, it has so many definite advantages that its further use would seem advisable. The number of cases in which it was used in this series is too few to draw conclusions from, however. The results from spinal anesthesia compare very favorably with the cases in which ether was used.

The large amount of splendid experimental work done on intestinal obstruction has given us light on the cause of death in this condition. Death has been shown to be due to a toxemia. Peritonitis and sepsis, although frequently developing in obstruction are accessory rather than essential factors in the fatal outcome. Whether toxemia is due to bacterial activity, as believed by Murphy and Vincent,[3] Murphy and Brooks,[4] Dragstedt et al,[5] or whether it is due to a toxin, a primary proteose, produced by perverted activity of the mucosa of the upper intestinal tract, as believed by Whipple and his co-workers, [6, 7, 8] is not definitely determined, although the evidence appears to favor the former view. Both groups of investigators agree that the toxin is not absorbed by the normal mucosa, although Dragstedt[5] feels that this protective action is not absolute. Hartwell, Hoguet, and Beekman[9] state that there are two factors at work in producing the symptoms, and causing death in this condition, loss of water from the tissues due to excessive drain into the bowel and entrance into the circulation of poisonous material which occurs only

when the mucosa of the bowel is damaged. This damage results largely from the trauma inflicted by the over-distention acting on the circulation, but possibly also from chemical action of digestive ferments stagnated above the obstruction. Such a damage having resulted, there occurs a bacterial invasion with a death of tissue cells, and in this process the poisonous substances are absorbed. Murphy and Brooks[4] believe that interference with the circulation of the obstructed intestine is an essential factor in allowing abnormal absorption, and that in the production of symptoms, the factors which make this absorption possible are more important than the factors which produce the toxin. Dragstedt et al[5] conclude that the substances responsible for the toxemia are produced by the action of the intestinal bacteria or proteins or their split products. An injury to the intestinal mucosa particularly that resulting from disturbances of the blood supply to the intestines, greatly facilitates the absorption of these poisons. From the above views we may conclude since the normal mucosa serves as a barrier to the toxins within the bowel lumen, that absorption takes place either because the poison is formed within the mucous membrane, as believed by Whipple and his co-workers, or on account of damage to the intestinal mucosa, which permits the toxins to enter the circulation directly.

It is difficult to apply the results obtained in experimental work to the treatment of the individual case. Attempts to produce immunity by injection of the poison into animals have not led to a clinical method of treatment. Although experimentally it may be advisable to remove damaged intestine to avoid absorption of toxin by it, yet the results of resection are so bad in practice that it is indicated as a rule only to avoid the danger of necrosis or perforation. If the bowel is viable, it should not be resected without the clearest indications. If there is doubt as to the ability of affected segment to pass on the intestinal contents, or if there has been much damage to the intestine above the obstruction from overdistention, an enterostomy should be done. There need be no fear that relief of obstruction by permitting the accumulated contents of the bowel above the point of obstruction to pass into the normal bowel below will result in toxic absorption. The particular method of dealing with a given case presents perhaps as great a test of skill and judgment as any that occurs in acute surgery. The type of operation employed depends on many factors, particularly the type of obstruction, the circulation of the bowel and the condition of the patient. Whether to relieve the obstruction only, to relieve the obstruction and add an enterostomy for drainage, or to drain the bowel under local anesthesia; where resection is necessary, and whether anastomosis should be added to resection, must all be decided on the merits of a given case. The importance of the presence of bloody serum in the peritoneal cavity as a sign of probable strangulation has already been noted.

E. A. Codman's[10] remarkable results in a recent series of cases of obstruction has brought up again the question of evacuation of the bowel above the obstruction by use of Monk's or Moynihan's tube. In this series Monk's tube was noted as used in only four cases, and not since 1912. Of these cases two recovered and two died. The general opinion of the surgeons operating on this series appears to be that the damage done by eviscerating the patient, and handling the distended bowel in order to thread it on the tube, outweighs the advantage gained by emptying the contents. On theoretical grounds, on account of the difficulty with which the toxin is absorbed from the lumen of the bowel, any benefit would appear to be due more to the relief of tension and congestion than to elimination of the poisons except in such cases as show damage to the gut. The great question, in the average case, provided that the shock of the operation is withstood, is whether peristaltic activity will come back. In many fatal cases peristalsis apparently stops after operation. Maintaining the peristaltic power of the bowel and avoiding shock by all means possible, by the type and briefness of anesthesia, by absence of evisceration and cooling of the intestine, and by gentleness and care in the necessary manipulation in the abdomen, are of extreme importance. Whether the advantage to be gained by the use of Monk's tube outweighs these factors is a point still to be determined.

The great value of the injection of fluids in prolonging the life of dogs with experimental obstruction has been shown by Hartwell and Hoguet.[11] Patients with obstruction are dehydrated by diminished absorption of fluids, and in many cases, by great loss of fluids in vomitus. The replacement of this loss, by subcu-

taneous injection, in larger amounts than we are ordinarily accustomed to use, is of extreme importance as a preliminary to operation and in after-treatment, and serves both to refill the tissues and circulation, and to dilute the toxemia.

We may conclude, from a comparison of the results of the two series of cases of intestinal obstruction, that the period during the second ten years shows a slight but definite advance in the treatment of this condition. In spite of this, the results of operative treatment remain far from satisfactory. Nor is there suggested, from the study of these cases or from the experimental evidence, any radical means of improving the results. From the nature of the condition, the results of treatment of late intestinal obstruction are likely to remain bad, in the absence of revolutionary advances in surgical knowledge. The important field for improvement in results lies in earlier diagnosis and early operation, at a stage when so difficult a problem for surgical treatment is not presented. An average duration of time from the onset of symptoms to operation of approximately three days cannot be considered satisfactory, and the chief hope for better results lies in the reduction of this period.

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DISCUSSION.

DR. RALPH H. SEELYE, Springfield: I think it is rather depressing that we should have two such series presented to us with such a very high mortality. I do not mean that it is depressing on account of any failure of the surgical procedures, but I mean it in the sense that it indicates failure in early diagnosis and early operation.

The lesson that is shown in all acute abdominal emergencies is most particularly shown here to be that of the importance of early diagnosis and early operation. Here in this series of cases showing over 100 deaths very many of them might have been prevented by early diagnosis and early operation. It is, however, encouraging in comparing the two series of the recent ten years and the previous ten years, to note in two instances a marked increase in the recoveries. I refer particularly to the cases of volvulus, where a mortality of 75 per cent. was brought down to 25 per cent., a very marked decrease; and also to the cases of obstruction the first week after operation, early post-operative obstructions, where the mortality has been very decidedly decreased. That means much better diagnosis, and it means perhaps that we are getting over the extreme prejudice that we cannot help but have in reopening an abdomen after an operation.

It really is one of the most difficult problems of this whole subject, it seems to me,—the question as to whether and when to reopen the abdomen after an operation. These cases of obstruction coming on early after an operation are very difficult for me to determine. It is encouraging also to find this series of cases improving in mortality. These are the cases that have been watched from the beginning.

I hope we shall be more ready to interfere during early symptoms and when, as Dr. Richardson says, there is a suspicion of trouble, and not wait until there is the surety of it, because in these post-operative cases particularly the patient goes to pieces all at once. I have noticed that they frequently pass very quickly from a condition which only arouses one's suspicion of obstruction into a condition in which they are practically beyond any hope of relief by operation.

It is to be earnestly hoped that we may be able to overcome our prejudices against secondary operations and have the good judgment to bring these cases to the operating room before it is too late.

DR. PEER P. JOHNSON, Beverly: The subject of intestinal obstruction has already been so well covered in the discussion of the previous papers that there is little left to be said. The striking feature of this series reported by Dr. Richardson is the high mortality and the great number of surgeons operating. However, the mortality compares favorably with that of other series previously reported.

In 1914 Deaver and Ross reported 276 cases with a mortality of 42 per cent.; in 1915, McGlannan reported a series of 276 cases also with a mortality of 45.7 per cent; Lynch and Draper in 1918 reported 24 cases with a mortality of 25 per cent.; and Codman in his recently reported series of 41 cases had a mortality of 34 per cent. My own experience has been limited to 27 cases, in which there has been a mortality of 18½ per cent., but only three of these cases quired resection of the bowel.

The point has been made, but it cannot be too much repeated, that the hope of reduction in mortality lies in early diagnosis. In my own series of cases those dying were operated three days after onset of symptoms. One is not quite

clear as to the cause of the reduction in mortality in this series of Dr. Richardson compared with the series previously reported by Dr. Scudder. It was undoubtedly due in measure to early diagnosis, improvement in operative technique as well as other factors. It was during this period that the stomach tube became an important factor in the treatment of intestinal obstruction and, to my mind, this is an important means of reducing mortality. The stomach tube should be used before operation, and after operation as frequently as indicated.

I wish to agree with the recommendation of Dr. Richardson in regard to operation under local anesthesia and the performance of enterostomy in the cases of early post-operative obstruction. Such obstructions are especially apt to occur after appendix operations with drainage, due to adhesion of one or more coils of small intestine well down in the pelvis. It requires more courage to open the belly, seize a loop of distended intestine and do an enterostomy than to search for the point of obstruction, but in the majority of cases this is all that is required. The obstruction is relieved spontaneously as the adhesions melt away and no further operation is, as a rule, required.

Dr. Jones has recommended the performance of enterostomy by the Witzell method. This is the method advised by Moynihan. The tube is enfolded in the bowel in such a way that when removed the opening is immediately closed and therefore there is no distressing leakage onto the abdominal wall and, at the same time, there is a water-tight joint which enables the distended bowel to be flushed out with large quantities of saline solution.

The only real difficulty, from an operative standpoint, comes in these late toxic cases with the bowel requiring resection. It seems to be the consensus of opinion that in all such cases the enterostomy should be done above the point of resection.

There is no doubt but that the improvement in our operative results in the future must depend almost entirely upon earlier operations as a result of earlier diagnosis, and the symptoms are as a general rule so sharply cut that there ought to be very little excuse for waiting three, four or seven days before arriving at a diagnosis. One of my cases came to operation seven days after onset, and only eight cases of the 27 were operated within 48 hours and yet, in every one of these cases, the symptoms were fairly well defined and should have aroused the suspicion within 24 hours that serious damage was going on within the abdomen.

Dr. E. A. Codman, Boston: My name has been quoted in connection with this subject, so that it shows I have a great interest in it. I feel that we have been greatly privileged in listening to the papers this afternoon. I think Dr. Richardson's work on this paper is a real, earnest, scientific attempt to find out what is the reason that the mortality is so high in intestinal obstruction; and Dr. Scudder, ten years ago, made this same sort of an analysis. It is obvious that that mortality is too high, and as Dr. Richardson has said, it has not kept pace with the improvement in acute abdominal surgery of other kinds.

Of course we all have our reasons for this sort of thing, and as this is a scientific meeting we are here to discuss the truth about these matters. I have published a paper recently, in which I claimed a successful series of 27 cases, where all recovered from the symptoms of intestinal obstruction, that is, they were relieved of obstruction, whether they died of other causes or not. Some of these were sub-acute cases and perhaps would not be given in such a series as that Dr. Richardson has shown. They were cases where one surgeon would say, put off until tomorrow, and another surgeon might say, go ahead at once. There is a very hard line to draw between those that are and those that are not absolutely acute, because many that are sub-acute today will be acute tomorrow.

Since then I have had two more cases which were successful, one in my own hands, and one that I referred to Dr. Jones because I thought there was a cancer at the sigmoid which he could handle better than I could, so that I can quote 29 successful successive cases, and I am ready to have them investigated.

I feel that I know what is wrong with that series at the Massachusetts General Hospital, and you will find the reason written between the lines in my recent paper. The fact that most of the first 14 cases I operated on were at the Massachusetts General Hospital when I had just started in surgery, and that I lost 11 of them, illustrates the system of organization which exists today in that hospital. It is science, truth and common sense that while the seniority system holds in our hospitals, we will go on discussing the high mortality of such serious conditions as intestinal obstruction at these meetings. There are things which some of us think we should not speak of. It is not the fault of the trustees altogether; it is the fault of all of us because we do not get down to brass tacks on these things. We are the persons to see that such a series ten years from now is better. It is the chiefs of service whom we should hold responsible.

The reader says there were 23 different operators for 121 (?) cases, and you will find that some of these cases were lost by surgeons of as little experience as I had had, prior to 1904. Surgery has changed in the last twenty or thirty years, and there are many more competent men to do ordinary operations such as appendectomy, than there used to be. What we need is a system whereby the more experienced men take the responsibility of the difficult cases and thereby leave the simpler operations for the less experienced.

DR. LINCOLN DAVIS, Boston: I think we do want to get at the truth of this, and that is why we are discussing these things. What Dr. Codman says about the senior members of the staff operating on these cases is undoubtedly true, and it may account perhaps somewhat for an increased mortality, but I do not think it does wholly.

If I understand his cases, he says he has had twenty-four cases of acute intestinal obstruction, all successful. It seems to me that it must be a different kind of case than what we have at the Massachusetts General. I know about some of those cases and have been personally responsible for some of them, one case in particular, a new-born infant whose intestine ended at the jejunum. There were also four cases of mesenteric thrombosis, only one of which was successful. I think those cases of acute intestinal obstruction at the hospital were pretty desperate cases, and I think many of them were neglected cases, just like a case I saw as I left there today, where you almost question whether it is right to operate at all or not.

In the case of intestinal obstruction oftentimes, if you are operating for a batting average you will let it alone, but if you realize that the only chance is mechanical relief you will operate. That is another thing that tended to increase the mortality of these cases, for they were not operating for a batting average but for the benefit of the patient.

If these Massachusetts General Hospital cases are to be compared with other series of cases they must be compared case by case, and the mortality will then be found to depend, in my opinion, upon the nature of the obstruction, whether there is strangulation of the bowel or not, and on the length of time that has elapsed.

DR. W. E. LADD, Boston: In emphasizing what Dr. Richardson and others have said in regard to early diagnosis, with special reference to intussusception, we have found at the Children's Hospital that in the cases taken in the first twelve hours we have no mortality. In the first twenty-four hours the mortality rises up to ten per cent., and between twenty-four and thirty-six hours it goes up to about twenty-five per cent. Between thirty-six and forty-eight hours it is fifty per cent., and over forty-eight hours it is often between ninety and one hundred per cent. For this reason we depend largely for our mortality on the speed with which the diagnosis was made. Any comparison of statistics without giving the duration of the obstruction is therefore obviously valueless.

DR. EDWARD R. NEWTON, Somerville: From the discussions it would seem that watchful waiting is the chief cause of trouble, and with the present state of surgery it is a thing for which there is no excuse or no necessity.

The minimum of danger in surgical interference in any part of the human anatomy is a warrant for exploratory operation and examination. Absolute diagnosis in these acute cases is almost an impossibility. We are too apt to go through the x-ray form of diagnosis and pass the case on, simply waiting to find out something we could very quickly have found out with less danger. We had our experience years ago with hernia strangulation. The danger was the attempt to reduce the hernia, and the danger today is the attempt to find out the cause, in 99 cases out of a hundred. The reason for the failure in these larger hospitals like the Massachusetts General Hospital, is because these cases have been brought in after they have been manipulated. Surgery is an art that we can depend upon and rely upon. We are not offering one-tenth of the danger in making an immediate exploratory operation. If we get right at these cases immediately, as we do with hernia strangulation, then we will reduce the mortality. We must educate the average physician to understand that, and we must educate our patients to understand that surgery can be depended upon. We must also educate the average practitioner that the minute he has a suspicious case he should immediately consult the authorities.

DR. RICHARDSON (closing): When preparing this paper, I thought of including statistics from other clinics. I did not do so for two reasons. In the first place such figures were not essential to the purpose of the paper. In the second place, figures are not comparable unless one knows what type of cases are included as acute intestinal obstruction. For instance, some series of cases include strangulated hernia or cancer of the colon; these cases would have to be left out to make such figures comparable to the present series. As far as the statistics from general hospitals are concerned, I think this series compares favorably on the whole with other institutions. It is not fair to compare results obtained in private practice, among people who demand prompt medical attention, with general hospital cases.

As to the cause for the high mortality, it seems to me that when cases come to operation at an average duration of time of three days from the onset of symptoms, as in the present series, a high mortality must be expected

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CANCER: FACTORS ENTERING INTO THE DELAY IN ITS SURGICAL TREATMENT.

BY CHANNING C. SIMMONS, M.D., BOSTON,
AND
ERNEST M. DALAND, M.D., BOSTON.

THE following paper is based on the 519 cases of carcinoma admitted to the surgical services of the Massachusetts General Hospital during the two years from January 1, 1917, to December 31, 1918. The authors wish to express their

thanks to Dr. R. B. Greenough who has taken an active interest in the results of the analysis and to whom they are indebted for many valuable suggestions.

In 1912 the Pennsylvania Medical Society appointed a committee to study the cancer problem. This committee analyzed 400 cases of cancer treated by practitioners throughout the state, and found that on the average in cases of superficial cancer the patient delayed 14 months before consulting a physician, and the physician kept the case under observation 12 months before advising operation. (Wainwright.)[1] In internal cancer the delay on the part of the physician was 13 months. In 1915 Gibson[2] analyzed 110 cases of carcinoma admitted to the New York Hospital. In 84.5% of these cases there was little or no chance of cure by operation. He also found that in at least 50% of the cases the disease was not recognized by the first physician consulted. Farr[3] analyzed 103 cases from the same clinic at a later date. He found 50% too far advanced for an attempt at operative cure when admitted to the hospital, and of these at least two-thirds had been given poor advice by their physician. The average delay from the time the patient first consulted a physician to the date of admission to the hospital was 8.7 months. Two years ago one of us (C. C. S.)[4] made a report similar to that of the Pennsylvania Commission, based on the cases of cancer of the breast and uterus observed at the Collis P. Huntington Memorial Hospital,—282 in number. This showed the delay on the part of the patient and the physician to be less in Massachusetts than in Pennsylvania and New York. The present report shows a slight improvement over that made two years ago in the two classes of cases in which the figures can be compared although the cases treated at the two hospitals come from the same community.

With the idea in view of making this report we attempted to determine the following facts in all cases of carcinoma entering the surgical wards of the Masachusetts General Hospital. First, how long the patient delayed after the first appearance of symptoms before he sought medical advice. Second, how long the physician kept the patient under observation before recommending operation and whether this delay on his part was due to the impossibility of making a diagnosis, failure to make the necessary physical examination, or failure to recognize the condition when it was visible. Third, how long the patient delayed after operation was advised before seeking surgical relief. The following questions were asked by the House Officers in all cases entering the hospital and the answers noted at the end of the record in red ink. The Executive Committee very kindly made this a hospital rule and the histories were gone over in the record room and the House Officer called to account if the facts were not filled in. It is needless to say that a certain number of cases did get by but in a large majority the questions were answered. The following were the four questions asked:

1. Date of onset and character of the first symptom of the disease.
2. Date of the first consultation.
3. Date on which operation was advised and by whom
4. Date of admission to the hospital.

The results are tabulated in Table I.

The data collected also show the relative frequency of the occurrence of carcinoma in the various organs. While there were but few cases of carcinoma of certain regions among those admitted to the hospital, the numbers occurring in the organs more frequently affected are sufficient to allow safe conclusions to be drawn. It will be noted that the figures in many of the groups in the tables do not balance; this is due to two causes. A delay of two weeks in an individual case was considered as no delay as it is impossible for a patient to make arrangements for an operation in much less time after one is advised. A physician must also necessarily have a short time to study every case. The second reason is that all the data were not available in every case. If one question was not satisfactorily answered in a given case the case was not thrown out except as regards that question.

The surgical services consist of the general surgical service, which cares for the gynecological cases, the nose and throat and the genito-urinary service. The medical services were not included as few cases of carcinoma are admitted to the medical wards and these, unless obviously inoperable, are transferred to the surgical services.

Age. The average age of the 519 patients was 52.9 years which is approximately the age given by most authorities. Carcinoma of the breast and cervix were seen at a somewhat earlier age, corresponding to the time of the menopause, while carcinoma of the buccal mu-

cosa, prostate and skin were seen later in life. It must be understood that this was the average age only and that the disease, although more common between fifty and sixty may be seen at any time of life. The youngest patient was 14, the oldest 83, and there are instances of carcinoma occurring under thirty in many of the larger groups of cases.

Sex. Males, 288. Females, 231. This proportion is rather unusual as statistics give the disease as more prevalent in the female. It is probably due to the fact that although the Massachusetts General Hospital is a general hospital, it does not treat proportionately as many cases of carcinoma of the female genitals as a hospital having a strictly gynecological service. It is also probable that many cases of carcinoma of the breast are operated upon at the smaller hospitals by their own physicians while these same hospitals are not so well equipped to care for cases of cancer of the stomach, prostate, bladder or buccal mucosa, all of which types are more common in the male.

Duration. The duration of the disease from the initial symptom to the patient's admission to the hospital was noted as an index of the rapidity of the growth in the various organs. The average duration of the total number of cases was 12.49 months. In groups of cases where the growth was visible from its inception, as in cancer of the skin, lip, or tongue, the figures are accurate. In cancer situated internally, such as cancer of the stomach or intestine, they are less accurate, as the growth was often symptomless until well advanced. The figures do show, however, that the rapidity of the growth varies greatly in different regions, and what might be termed a short duration in cancer of the breast is long in cancer of the tongue. In the latter situation the tumor is often beyond hope of cure by radical operation in two months or less.

Duration to First Consultation. The average duration of the disease from the onset of symptoms to the first consultation with a physician was 5.4 months. This is a very much better showing than is given in the report of the Pennsylvania Commission, the delay in that series being 14 months. The delay varied greatly in carcinoma of the various regions and also within wide limits in all groups. Rapidity of growth was the chief reason leading the patient to consult a physician. In cancer of the buccal mucosa, a rapidly growing type, the average delay was a little over two months, while in cancer of the prostate it was 10 months, in the breast 11.4 months, and of the skin, a very slow growing variety, 11.6 months.

There seemed to be little relation between the delay and the character of the first symptom. The classical answer in cases of cancer of the breast when the patient was asked why she did nothing about it until the tumor had obtained considerable size, was "but it did not pain." In cancer of other organs in which pain was the first symptom the patient delayed almost equally as long.

In carcinoma of the prostate the delay was 10 months although in every instance the patient suffered distinct inconvenience such as pain, frequency, retention or hematuria. Cases in which the first symptom was hemorrhage or a bloody discharge consulted the physician somewhat more promptly than the average. This did not apply to cancer of the uterus but did to cancer of the stomach, oesophagus, genito-urinary tract and rectum. Why a woman who develops a bloody vaginal discharge some years after the menopause does not seek medical advice promptly it is difficult to say. In cancer of the rectum the average delay to the first consultation was 8.1 months, but when hemorrhage was the first symptom it was 4.3 months (Table V).

The first symptom was tumor or ulcer in 36% of the cases, pain in 25%, what may be termed symptoms peculiar to the organ in 18%, and miscellaneous in 21%. The proportion of tumors is large, as such a relatively large number of the cases were cancer of the breast or buccal mucosa, in which position tumor is the first symptom. In studying the cases further it would seem that there were few symptoms due to the disease itself, but that they were as a rule dependent upon the organ attacked. Thus tumor was usually the first symptom in cancer of the breast, ulcer in cancer of the mouth, pain in cancer of the stomach, dysphagia in cancer of the oesophagus, etc. No rule can therefore be given to the laity or to the physician as to the first symptom of cancer although it should not be difficult to educate the public to observe the first symptom in the organs commonly affected. This would materially lessen the number of cases now hopeless as regards operative cure when first seen. Carcinoma in certain regions may be symptomless until far advanced.

This is particularly true in cancer of the stomach or intestines in which the first symptom may be obstruction. This is especially unfortunate as in intestinal carcinoma metastases are formed late, and if the case is seen early the chance of cure by radical operation should be good.

In many instances the first symptoms of cancer were similar to those of a nonmalignant disease of the same organ, and in this case the patient can only be urged to consult a physician for any symptoms. The physician, however, should recognize that, while abdominal pain may be due to an error in diet, if persistent it may denote cancer, and that a slow increase in the size of the abdomen may be due to a slow-growing ovarian cyst and not an increase in the subcutaneous fat. In other words the possibility of cancer must be considered in every case.

Delay from the first consultation to operation advised. The average delay in all cases on the part of the physician from the time the patient first consulted him to the time operation was advised was three months. This varied greatly with the position, and the type and rapidity of the growth and the average for cancer in general cannot be applied to cancer of a special organ. In studying the individual cases it is evident that the greater number of physicians suspected or recognized the condition promptly and sent the patient to the hospital for study or for operation. A few did not. In cancer of the breast there was practically no delay. The tumor is easily recognized, the operation not difficult, and there is practically no other treatment for any tumor of the breast. In cancer of the buccal mucosa the average delay was two months which, considering the rapidity of the growth, is long. This suggests lack of appreciation of the fact that a painless ulcer of the tongue is almost invariably cancer and is at one time a purely local condition. In certain cases it was apparently not appreciated that flowing coming on several years after the menopause almost always denotes cancer of the uterus and that the case should be considered as one of malignant disease until proved otherwise. It is manifestly impossible to have x-ray studies of the intestinal tract made at the first visit in every case of indigestion and yet this is the only method by which cancer of the stomach or intestines can be diagnosed in its early stages. It would seem, however, that this should be advised early in cases that do not respond at once to treatment.

As examples of the few cases of failure to make a diagnosis through negligence we can cite failure to make a digital examination in all cases of bleeding from the rectum or vagina, or failure to make a laryngoscopic examination in cases complaining of persistent difficulty in phonation

It seems fair to say on the strength of these figures that although most physicians recognize the condition and advise operation promptly, there is a longer delay on the part of a few than is justifiable. Either the possibility of cancer is not considered in a given case, or the importance of early surgical intervention is not appreciated

Delay operation advised to operation. The

Table I.

	No. Cases	Duration	Delay to 1st Consult.	Delay to Oprn. Adv.	Delay Oprn. Adv. to Oprn.	Radical Oprn.	Deaths	Other Oprns.
Tongue	21	4.3 mos.	1.7 mos.	0.9 mos.	0.7 mos.	9	0	5
Lower jaw	10	4.3 mos.	2.0 mos.	3.0 mos.	0.3 mos.	4	0	3
Upper jaw	5	9.0 mos.	4.0 mos.	4.0 mos.	0.0 mos.	3	0	0
Cheek (inside)	7	6.3 mos.	3.2 mos.	1.1 mos	0.0 mos.	2	0	1
Lip	35	11.9 mos.	7.9 mos.	2.0 mos.	1.2 mos.	28	2	5
Esophagus	17	5.3 mos.	2.0 mos.	1.0 mos.	0.0 mos.	0	0	16
Stomach	82	8.8 mos.	3.8 mos.	6.4 mos.	0.8 mos.	12	7	56
Intestines	33	9.4 mos.	4.7 mos.	5.4 mos.	0.0 mos.	8	4	21
Rectum	44	12.3 mos.	8.4 mos.	5.3 mos.	0.7 mos.	20	8	16
Breast	79	11.4 mos.	8.4 mos.	0.5 mos.	0.5 mos.	63	2	12
Body uterus	8	13.0 mos.	6.4 mos.	4.8 mos.	0.0 mos.	5	1	2
Cervix	51	7.6 mos.	4.4 mos.	1.6 mos.	1.5 mos.	24	3	20
Prostate	25	15.0 mos.	10.0 mos.	3.0 mos.	1.2 mos.	12	5	9
Bladder	27	25.1 mos.	13.0 mos.	3.4 mos.	1.2 mos.	6	1	14
Penis	5	2.8 mos.	1.5 mos.	3.4 mos.	0.4 mos.	3	0	2
Larynx	12	14.0 mos.	11.0 mos.	2.0 mos.	2.0 mos.	4	2	5
Skin	26	21.3 mos.	11.4 mos.	7.0 mos.	5.8 mos.	21	0	3
Miscellaneous	34	7.6 mos.	3.1 mos.	1.1 mos.	1.0 mos.	7	0	24
Totals	519	12.49 mos.	5.4 mos.	3.0 mos.	0.76 mos.	231	35 (15%)	212

average delay on the part of the patient after operation was advised until it was performed was three weeks. This is practically no delay. Nearly all patients apparently accepted the advice of the physician and made arrangements for operations at once. The average was brought up to three weeks by a few cases who delayed a long time, and by cases in certain groups, as cancer of the prostate or skin, in which the delay was 2 and 5.8 months, respectively. Some of the delay is probably due to the fact that in cancer of certain organs much preliminary work is necessary before the patient is in condition to undergo the operation. But nine patients refused operation when it was advised. It may be said, therefore, that patients in this community accept the physician's advice in regard to operation, and that there is practically no delay on their part after the advice is given.

Operation. It is discouraging to find a small number of cases suitable for an attempt at cure by a radical operation when admitted to the hospital, but this again varied as to the type and position of the growth. The percentage would be smaller if all cases applying were admitted to the wards as many are seen in the Out-Patient Department and if frankly inoperable are referred back to their physician or to other institutions. In no case of carcinoma of the œsophagus was a radical operation attempted (17 cases), but in carcinoma of the breast a radical operation was performed in many instances in which the chance of cure was remote. The figures in the other groups varied between these two extremes.

Of all the cases admitted to the hospital less than one-half (44.5%) were considered suitable for an attempt at cure by a radical operation and in these cases there was an operative mortality of 15% confined chiefly to operations upon the intestinal and genito-urinary tracts. In 28% of the cases no operation was performed or exploration only, while in 27% a palliative operation, such as gastro-enterostomy, cauterization of the cervix, or tracheotomy was done. The operative mortality following these palliative procedures was nearly as great, 14.5%, as in those cases in which a radical cure was attempted, but in this second group the patient was often in poor physical condition and the operation was not one of choice (Table II).

This mortality seems extremely high particularly in those cases in which a laparotomy was performed. It must be understood, however, that many of the patients were in poor physical condition. It was also obvious in reading the records that the surgeons did not consider their own mortality statistics but in nearly every instance gave the patient the benefit of the doubt and, knowing what the outcome would be without surgical intervention, performed a radical operation in many cases of advanced carcinoma and on many patients who were poor operative risks.

A much better idea of the operative mortality can be obtained if the cases are considered in groups. Thus in cancer of the buccal cavity and lip, a group of 49 operations, the mortality was 4%, which is low considering the extent of many of the operations on the tongue and jaw. In cancer of the abdominal cavity in which a laparotomy was performed the mortality was 32% and in cancer of the genito-

Table II. Operations

	Cases	Deaths
Radical	231 (44.5%)	35 (15%)
Palliative	139 (27%)	20 (14.5%)
Exploratory	73	4 (5.4%)
None	76	4 (5.2%)

Table III. Mortality.

(Radical Operations.)

	Cases	Deaths	Per Cent.
Mouth, jaw, etc.	49	2	4.1%
Laparotomies	71	23	32.0%
Genito-urinary	22	6	27.0%
Miscellaneous	89	4	4.5%

Table IV. Causes of Death Following Operations.

General peritonitis	20*
Shock	14
Pneumonia, etc.	7
Sepsis	4
Pulmonary embolism	3†
Uremia	1
Hemorrhage	1
Diabetes	1
Pyonephrosis	1
"Cardiac"	3
Intestinal obstruction	2
No operation	4

* In 167 laparotomies, 12%.
† Breast, rectum, cervix, 449 ops., .66%.

Table V. First Symptoms.

(Much condensed.)

Tumor	107
Ulcer	78
Pain	128
Bleeding	70
Discharge	9
Phlebitis	1
Vomiting	12
Loss weight, etc.	11
Deformity	1
Symptoms peculiar to organ	96
Undetermined	6

urinary tract 27%. In operations for cancer of other organs, breast, uterus, larynx, skin, etc., the mortality was 4.5% (Table III).

Taking into consideration the operative mortality the expectation of operative cure of cases of carcinoma entering a general hospital is strikingly small. Of the entire group 37.7% of the cases entering the hospital survived a radical operation and it is this 37.7% upon which statistics in regard to the operative cure of cancer are ordinarily based. The percentage of cures varies greatly in carcinoma of different regions but it seems fair to say that not over 25% of cases subjected to a radical operation are cured, which corresponds to 9.4% of all cases admitted to the hospital. It must always be borne in mind that these figures are based on consecutive, not selected cases. Considering the cases in groups the expectation of operative cure in consecutive cases entering a general hospital is as follows: Carcinoma of the buccal cavity (if 16% of all cases surviving a radical operation are cured) 10%. Carcinoma of the cervix (if 25% of the cases are cured) 8.7%. Carcinoma of the rectum (if 20% of the cases are cured) 5.4%. Carcinoma of the stomach (if 20% of the cases operated upon are cured) 1.2%.

The chief cause of death in all cases operated upon was sepsis in some form. Thus in 167 laparotomies there were 20 deaths, 12%, from general peritonitis. Fourteen died from shock, and seven from post-operative pneumonia. There were three deaths from pulmonary embolism in 449 operations, an operative mortality from this cause of .66%. The embolism occurred after radical operations for cancer of the uterus, breast, and rectum. Other causes of death were intestinal obstruction, pyonephrosis, uraemia, diabetes, etc.

Heredity. In studying the cases the family histories were read to determine the relation of heredity to cancer. The facts were noted in the records in 403 cases, of which 46, 11.4%, gave a history of cancer occurring in the immediate family. The fact that no case of cancer had occurred in the family was stated in 357 cases. Considering the frequency of cancer in adults over forty, a family history of the disease in 11.4% of the cases is not large and suggests that heredity as a predisposing factor is of little moment.

CONCLUSIONS.

1. The symptoms of cancer are dependent on the organ attacked. There are few symptoms characteristic of the disease itself in its early stages.

2. The rapidity of the growth varies within wide limits in the organs attacked and what may be termed long duration in cancer in one situation is short in another.

3. The average duration of the disease in all cases on their admission to a hospital is 12.49 months. The duration may be divided into three periods,—the length of time from the first appearance of symptoms to the first consultation with a physician, representing delay on the part of the patient. 2. The time from the first consultation with a physician until an operation is advised, representing delay on the part of the physician. 3, The time elapsed after the advice for operation is given until the patient enters the hospital, representing a second period of delay on the part of the patient.

4. The delay on the part of the patient after the onset of symptoms before seeking medical advice is 5.4 months. It varies considerably as to the situation of the tumor and the rapidity of its growth, but has little relation to the character of the first symptom.

5. The average delay on the part of the physician before advising operation is three months. The great majority of physicians in this community recognize the condition and advise operation promptly. The delay in carcinoma of certain regions is longer than is justifiable, however.

6. There is practically no delay on the part of the patient after operation is advised. The advice is accepted and arrangements made for operation at once.

7. In only 44.5% of the cases of cancer admitted to a general hospital is there any hope of cure by a radical operation. The operative mortality in these cases is 15%, sepsis, shock, and pneumonia being the chief causes of death in the order named.

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DISCUSSION.

Dr. Edward Reynolds, Boston. This paper drives home satisfactorily the most important nail in the subject of cancer. The cause of the enormous mortality, and of the still more important suffering, from the malignant diseases is in the majority of cases directly traceable to delay either on the part of the patient or the physician. The difficulty in teaching the pub-

lic to come earlier is, as Dr. Simmons has shown clearly, the fact that there are no symptoms of cancer as cancer, but that there are the symptoms of a new growth in the organ and dependent upon the organ it attacks. Nevertheless, it is comparatively easy to teach the public the leading symptoms which should be watched for, in each of the common organs, and thus bring them to the physician in the early stage. I think it is true that in this locality a large proportion of the profession are recognizing the curable stages of cancer, and this is due largely to the campaign that has been waged. It is not true of the country as a whole.

Apparently the worst delay is largely due to the undoubted fact that, with the exception of a few very recent graduates, the whole profession has been carefully educated to a differential diagnosis between the benign and malignant new growths. We were all taught that certain signs and symptoms were essential to a diagnosis of cancer. It is pretty hard for us to reverse and realize that the classical diagnosis of cancer is only the diagnosis of incurable cancer. I recall the dictum which the late Maurice Richardson quoted so often, and for which he was at first criticized, "*Ubi tumor, ibi incisio.*" "Where you find a new growth get it out," is almost in itself the dictum of surgical authority today. It is certainly a fact that all neoplasms of doubtful character should be regarded as potential malignancies, and operated on when they are detected, and not after delay. Of course we must modify the statement a little in certain situations, especially in operations of the digestive tract where the operations are necessarily so mutilating and severe that we must often wait a little, but in the ordinary situations no neoplasms of doubtful character should be allowed to remain.

"*Ubi tumor, ibi incisio:*" when the profession as a whole has been educated to that we shall cut the mortality of cancer, and not until then.

DR. PHILEMON E. TRUESDALE, Fall River: These records as given by Dr. Simmons are extremely valuable and very timely, because they point out the weak places in the chain of factors which are causing the delay in operations for cancer. These must be strengthened before we can expect to have cancer patients referred for operation in the curable stage. When the delay is the fault of the patient, it is usually because the diagnosis is not made or, when made, the patient does not care to be operated upon. I must say that this interval of three weeks which is recorded here would not apply generally. I think it is much longer. As a rule the patients go home and think about the operation for some time before they are willing to submit to it. You will now and then hear a patient say, "I had just as soon die from cancer as from the operation." There seems to be this fear of surgery and the impression that surgery does not cure cancer. These impressions are due to the fact that the results of failure become common knowledge and the report of success reaches only a limited number of people. The individual should be impressed with the fact that surgery, when undertaken at the very onset of the disease, offers a good hope of cure. When that point is not driven home at the start there are a great many cases where the interval between the time when the patient knows the condition to be cancer and the time of the operation is much longer than three weeks.

Where the fault of delay is due to the physician it is not always because he has not made a diagnosis but because some doubt exists in his own mind as to the accuracy of the diagnosis; therefore he wants time for observation and study. If prolonged, this is apt to lull the patient into a period of inoperability; yet occasionally it is unavoidable. In the treatment of cancer of the tongue and cancer of the breast, with manifestations of the disease plainly apparent, there is no excuse for delay, but in cases of cancer of the stomach it is a different story. There the disease is often very insidious and may be obscure until inoperable. It happens often that cancer develops in other regions of the stomach than at the pylorus, such as on the lesser curvature or at the fundus. In these regions it may be obviously inoperable when discovered, yet nobody could prove that cancer existed, nor had the patient suffered severely from its presence. It is well to remember that there are other diseases than cancer of the stomach which produce practically the same clinical picture. Tuberculosis of the lungs, for example, presents a general toxemia, anemia, and disturbance of gastric function not unlike that of cancer in an obscure part of the stomach. Syphilis of the stomach will produce clinical symptoms somewhat analogous to those of cancer.

When all the available means of diagnosis have been employed and there still exists a doubt as to the presence of cancer, especially within the abdominal cavity, I believe that one should urge the patient to have a surgical examination. By that I mean an examination of the abdominal viscera by a laparotomy. The expression, "surgical examination," is preferable to "exploratory laparotomy." The latter does not sound good to patients. Besides, many have charged excessive fees for exploratory laparotomies, with the incidental removal of an appendix. A surgical examination, when explained, appeals to the patient at a very reasonable procedure. For those who pay, a charge of from $25 to $50 is made. This puts it on the same level as an x-ray examination. One does not employ more assistants nor require more instruments nor as much time as is necessary for an x-ray examination, so that the above figures would place the procedure on the basis of an examination and not an operation, providing,

of course, that some real surgical procedure was not undertaken.

Taking cancer of the stomach 30%, cancer of the uterus 11%, and cancer of the rectum 10%, we find about 50% of the cases in these three categories. These can be discovered earlier than they are at present only by more precise methods of examination. Until we have something better, surgical examinations should be used more frequently in the suspected stomach cases. Vaginal examination and pathological examinations of the tissue from suspicious areas of the cervix will reduce the number of late operations for cancer of the cervix. Rectal examination is also very important if we are on the hunt for cancer, and we really ought to be on the look out for cancer always. If cancer is constantly in our thoughts, fewer cases will escape unnoticed. If a rectal examination is made in every case involving the rectum and colon we will find cancer frequently where we are not liable to strongly suspect it.

I believe that the hope of further reduction in the mortality of cancer lies in the great influence and efforts of the American Society for the Control of Cancer. The knowledge which this society is disseminating everywhere is bringing people to the realization that all fake cures result in loss of time and money, that the allied methods of treatment, such as x-ray and radium, have a limited field of usefulness, and that surgery early applied is almost never fatal and at present is the most dependable treatment for cancer.

Dr. Ralph W. Jackson, Fall River: Dr. Truesdale, my fellow-townsman, has touched on some of the things I want to speak of. It seems to me that there is no location in which cancer is more marked by insidiousness of onset than in the rectum. Of course, as a proctologist, I see more of that sort than any other form of cancer, and am perhaps more awake to the possibilities, but I don't think that the profession at large begins to realize the early and beginning symptoms of cancer of the rectum as it should.

You can lay it down as an axiom that cancer is a possibility in a patient of cancer age whose bowels have been habitually constipated and become regular, have been regular and have become loose, or where attacks of looseness supervene on either habit, whether there be any blood or not. Remember, too, that the cancer age is not necessarily over thirty; it is sometimes under twenty. Such symptoms call for an adequate rectal examination in every instance. You may not find cancer; you usually will not; but no harm is done by the examination, while hesitation allows the growth to go on to a stage of near or complete inoperability, before the diagnosis is made.

I don't know why it is that most practitioners hate so to put their fingers into the rectum, when most of these cancers are within easy reach. It is not unusual to see patients who have traveled from doctor to doctor for perhaps one or two years, saying to them, "Doctor, I have piles," a self-made diagnosis which has been accepted without examination and a salve or suppository ordered. Finally they get into the hands of one who is willing to make a digital examination, and he finds there growths that are already obstructive.

Further than this, attention should be called to the fact that we do not, as we should, employ all possible diagnostic means. I refer to the use of the sigmoidoscope. A cancer which is not within reach of the finger is almost without exception within reach of that instrument. Yet, how many men who graduate from medical schools know how to use the sigmoidoscope? How many know how to interpret the findings as they see pathological growths through it? The percentage is exceedingly small. I am surprised to note how many internes in our hospitals have never seen one used, and are delighed with the first demonstration.

Dr. Truesdale said that a considerable percentage of cases of cancer have been operated on for hemorrhoids first. Yes, and why? Because the operator didn't know that cancerous pathology frequently coexists with and may even be the cause of hemorrhoidal pathology. Before every operation for hemorrhoids, or other anal condition, there is an easy opportunity to make a higher examination, and it should be done as a routine. An unsuspected, but operable, growth may perhaps be diagnosed, and one avoids the chagrin of finding later that he has made a fatal oversight.

What I have said is a serious reflection on the profession's ignorance of premonitory symptoms, its hesitancy to make any examinations, and its failure to use the means which are at hand for diagnosis, and not difficult to use. It is an equally serious reflection on the medical schools for not properly teaching proctology and the use of its diagnostic implements.

Dr. R. B. Greenough, Boston: I believe this paper of Dr. Simmons and Dr. Daland is a most important contribution to the subject of cancer surgery. We all know that delay in obtaining radical surgical treatment is the most common cause of failure to cure by operation. This paper attempts to analyze the causes and the extent of this delay in a large series of cases of cancer of different organs, and to point out the situations in which further education of the public or of the practising physician will bring about the greatest improvement.

The layman must be educated to seek advice more promptly, and the physician must realize that the loss of an average of three months' time in arriving at a diagnosis is too long to permit the best results when surgical consultation is at last advised. The fact that the patient does not delay for any considerable time after an operation is once advised indicates that

he has faith in the judgment of his physician.

It behooves us, therefore, as physicians, to see that the patient's confidence in us is not misplaced. If we are to secure to the patient his best opportunity for cure we must cut this period of three months to one of two or three weeks, at the very longest, and if we, ourselves, are unable to arrive at a diagnosis in that time we must seek assistance where it may be available, or advise an exploratory operation.

DR. PIERCE P. MCGANN, Boston: I should like to ask Dr. Simmons what he thinks the patients should be told in these cases. Isn't the doctor who tells the patient that he has a tumor putting himself in the position of disputing the other doctor who is called later and is responsible for the operation? It is sometimes a cause of trouble to tell the patient that he has a tumor, and tell the patient's family that you know you are operating for cancer. The question is, what should the patient be told?

DR. SIMMONS (closing)—in reply to Dr. McGann: That is a difficult proposition, and how much the patient should be told depends on the individual case. It usually happens that the patient is badly frightened if told he has a cancer, unless the statement is modified, as for example, saying it is a mild type or a curable type if this is true. If the patient is intelligent it is best to tell him he has a beginning cancer. It is more the method of going at it than what is actually told.

There is one thing I should like to add and that is as to the value of a positive Wassermann reaction. In carcinoma in certain regions the fact that the Wassermann is positive should not allow us to rule out malignant disease as cancer and syphilis frequently coexist. Appropriate treatment will improve the condition but the cancer will continue to grow and the time for a radical operation is thereby allowed to pass.

Book Reviews.

The Journal of Industrial Hygiene.

The June issue of *The Journal of Industrial Hygiene* contains a number of articles of unusual interest, and in addition, comprehensive abstracts of current literature. Major A. C. Fieldner has described and illustrated by charts and photographs the use of the present army gas mask, and has offered suggestions for modifying them to meet special conditions. In his paper, "Human Health and the American Engineer," G. C. Whipple, S. B., enumerates the lessons in sanitary engineering, hygiene, medicine, and preventive medicine, which we have learned from the war, and outlines the probable development of public health administration. W. R. Hurley, M.D., has contributed an illustrated article on "Chip Fractures of Terminal Phalanges," in which he has cited histories of seven persons who had been injured in this way. An investigation of inorganic poisons, other than lead, in American industries, has been reported by Alice Hamilton, M.D. Cases of poisoning due to zinc, copper, and brass, arsenic, antimony, mercury, carbon disulphide, phosphorus, and carbon monoxide are described and their prevalence estimated. "Medical Inspection of Factory Employees," by M. A. Austin, M.D., indicates the importance of this work both to industry and to the individual.

The second part of *The Journal of Industrial Hygiene* contains abstracts of current literature, both domestic and foreign, dealing with industrial aspects of medicine, surgery, nursing, sanitation, and reconstruction.

Lice and Their Menace to Man. By LIEUT. LL. LLOYD, R.A.M.C. (T.) London: Henry Frowde, Oxford University Press, Hodder & Stoughton, Warwick Square, E. C. 1919.

During the last four years it has been proven beyond question that at least three diseases prevalent among the soldiers are directly traceable to lice. Typhus fever, relapsing fever and trench fever are all louse-borne diseases and through the ravages of these maladies the attention of the warring countries of the world has been directed toward this ancient, though in recent years comparatively unfamiliar, pest. As a sanitary measure to be pursued with diligence in the future among civilians as well as in the army, the public should be acquainted with the necessary precautions against infection by lice and the best methods of ridding communities of these disease carriers. Much information on the subject has been gathered by recent workers and a very valuable contribution to our present knowledge is contained within the pages of Lieutenant Lloyd's book. This volume is intended primarily for the general reader and explains in an interesting way the life history and habits of the louse, methods of disinfection, dissemination, and several common species. A separate chapter on Trench Fever by Major W. Byam, R.A.M.C., supplements those of the author on Typhus Fever, and Relapsing Fever. Replete with references on the subject to articles recently written, it also contains excellent illustrations and charts. The value of this little book as a helpful understanding of a most urgent sanitary problem would seem to be quite out of proportion to its size.

THE BOSTON
Medical and Surgical Journal

Established in 1812

An independently owned Journal of Medicine and Surgery, published weekly under the direction of the Editors and an Advisory Committee, by the Boston Medical and Surgical Journal Society, Inc.

THURSDAY, SEPTEMBER 2, 1920

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Papers for publication, and all other communications for the Editorial Department, should be addressed to the Editor, 126 Massachusetts Ave., Boston 17. Notices and other material for the editorial pages must be received not later than noon on the Saturday preceding the date of publication. Orders for reprints must be returned in writing to the printer with the galley proof of papers. The Journal will furnish free to the author, upon his written request, one hundred eight-page reprints without covers, or the equivalent in pages in the case of articles of greater length.

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BOSTON MEDICAL AND SURGICAL JOURNAL
126 Massachusetts Ave., Cor. Boylston St., Boston 17, Massachusetts

THE DEVELOPMENT OF MEDICAL RESEARCH.

One hears frequently of the dependence of medicine upon science, but less often of the debts which science owes to medicine. In an address on "Medical Research" before the British Medical Association at the Cambridge meeting, Sir T. Clifford Allbutt called attention to the importance of medical research on the scientific problems of life. He states that without medicine, bacteriology and the study of the cell would have made slow progress; without the study of the cells of bacteria, of algae, of protozoa, we should know less of the secret of life than we do at present. Medicine has promoted research on organic synthesis, and conversely, on the reduction of foods into the more complex amino-acids before being re-woven into the tissues of life.

The nitrifying bacteria live on inorganic matter in the dark soil; so in the light some inorganic colloidal systems can build up formaldehyde. Medicine introduced the chemist to the domain of hormones and chalones. May we not also attribute it largely to medicine that the study of enzymes has thrown light upon the operations of catalysis which is incessantly forwarding the processes of nature? It may be that the vitamines are agents of this kind, agents which have upset our cruder calculations of nutritive values. Medicine has taught us how the lung deals with the CO_2 ions, and the kidneys with sundry other acids, and that there are other subtle causes of anoxaemia besides the cardio-pulmonary.

In solving the mystery of living "form," science and medicine alike have been baffled in discovering its determination. How constant form is maintained amid the continuous changes of our changing matter is a problem of second interest only to the enigma of the origin of life itself. A few years ago the animal was regarded merely as a diagram of incident forces; today we attach some importance, if not to moulding entities, at any rate to some phases which partake both of germ and matrix. Scientists are still concerned with the question of functional adaptation and environmental change. On the other hand, the constancy of bacterial species furnishes us reason to marvel and medicine has made numerous significant observations on the relations between microbes and body changes. Through acquired immunity we learn that cells are teachable.

In research lies the solution of the mysteries of life. Medical research must combine natural observation and artificial experiment. We have witnessed within the last half century the advance from deadhouse pathology to more refined and penetrating methods, and there are being unfolded continually more intimate methods, those of biochemistry, for instance. Research in observation watches nature; as experiment it tests events under artificial conditions of separation or isolation, and measures their phases. We must first have an idea in our minds; and for this a certain kind of imagination is needed, one of general concepts rather

than of concrete individualizing imagination. Henri Poincaré has said of scientific discovery that it consists of three stages: the first stage is of laborious work at the problem on all sides; the next is not one of conscious occupation with the subject but of unconscious cerebration, during which a promising hypothesis may arise unexpectedly in the mind; the third is deliberate verification and completion of form. In this way, out of an unlimited number of possible combinations and by many speculations the discoverer at length divines the true one. In medicine this has been clearly the course of surgery, which has ceased to be observational and has become almost a ritual. In promoting research into the origin of diseases, it is important to engage in scientific investigation the general practitioner, who should be able to detect diseases in their incipience. The progress of medicine must be in large part endogenous. While pathologists were working on morbid phenomena without ever seeing a sick man, Sir James Mackenzie was bringing laboratory equipment and exquisite laboratory methods to the bedside. The polygraph has proved again, as Plato said five centuries before Christ, that science consists in measurement. A more searching discipline is needed among practitioners. The laws of inheritance must be sought out first on animals, as the generations of man are too long for comprehension. We must also enter a larger field, and discover and compare the elements and phases of disease in animals and in plants. The comparative survey must cover the lowest of living to the highest. Medical research should be conducted with the knowledge that diseases are not entities nor even recurrent phases of independent events, but partial aspects of a universal series.

THE INDIGENT MIGRATORY CONSUMPTIVE PROBLEM.

In a previous issue of the JOURNAL we commented editorially upon the inadvisability of tuberculous persons' migrating, without adequate means, from the East to middle-western states in search of health. A study made recently by the Texas Public Health Association enables us to estimate more accurately the results of this policy and the extent of this problem in the southwest. An effort has been made to determine the exact facts in the matter by investigating thoroughly a typical resort community to which consumptives migrate from various parts of the country. There is little doubt that if these migratory consumptives were placed in sanatoria they would benefit themselves physically and the state economically; when, however, they enter the state in a precarious financial condition, not only are they in danger of further injury to their health, but also they become an economic burden to the community in which they settle.

The Texas community under consideration had a population of approximately sixteen thousand people. During the year beginning September 1, 1918, to September 1, 1919, there were two hundred and eight deaths, of which eighty were caused by tuberculosis, thus giving a death rate of five hundred per one hundred thousand as compared with the estimated rate of 146.6 per one hundred thousand for the United States. From these figures it is evident that the excessive death rate from tuberculosis is caused by the great amount of migration of tuberculous people into the community. Furthermore, forty-six of those who died of tuberculosis in the community were removed to other places for burial, sixteen to other states, thereby indicating the great number of people who make the community a temporary home. Something of the cost to the community of these persons is shown by the fact that during the twelve months covered by the survey, one organization engaged in relief work spent $1,128.77 on twenty indigent tuberculous people, and over forty applied for financial aid. Of these twenty, only six could be found by the investigators; the remaining fourteen had roved to other communities. Of one hundred and ninety-three cases personally interviewed, it was found that fifty-four remained in the country less than ninety days; forty-six more stayed from three months to a year. These figures are a significant index to the roving nature of the migratory consumptive. It is evident that those consumptives who are dependent on relatives, on friends, charity, or upon limited savings or labor are in a somewhat precarious condition and that the withdrawal of support, the using up of small savings, or the loss of work might throw them upon the charity of the community. Out of one hundred and ninety-three tuberculous people, sixty-three were found to be in a

precarious financial condition; of these sixty-three, fifty-six had come to the community from other cities or states.

An intelligent and extensive study of other communities is necessary before adequate statistics can be obtained to justify a request for legislation to prevent the futile wandering about of the indigent consumptive. These figures and statements of the Texas Public Health Association are, however, evidence of the fact that the roving tendency of the migratory consumptive not infrequently results in the impaired physical condition and economic status of the individual, in a burden to the community, and in danger to other people of infection from contact with tuberculous persons.

MEDICAL NOTES.

Election of Colonel Richard P. Strong to the Serbian Medical Society.—In recognition of his scientific achievements and as a mark of appreciation for his sympathy with the Serbian people, Colonel Richard P. Strong, chief medical director of the League of Red Cross Societies, has been elected an honorary member of the Serbian Medical Society.

Appointment of Dr. Jacob Sobel.—Announcement has been made of the appointment of Dr. Jacob Sobel as assistant director of the Bureau of Child Hygiene of the New York City Department of Health.

The British Medical Association.—The annual subscription rates of the British Medical Association have been increased from two to three guineas. This increase was necessary both because of the increased cost of producing the Journal and the need for adequate funds with which to carry on the progressive policy of the Association.

Preservation of Vaccine Virus.—The issue of the *Public Health Report* for July 23, 1920, emphasizes the importance of keeping vaccine virus at a low temperature. The length of time that vaccine virus may remain potent under unfavorable temperature conditions varies according to such circumstances as initial potency and reaction of medium. If it is to be depended upon, it should be kept at a degree not far above the freezing point of water, and if it can be kept below the freezing point, so much the better. The United States Pharmacopoeia, ninth decennial revision, specifies temperatures between 4.5° and 15° C. for vaccine virus; it is stated in the Public Health Report, however, that the latter figure given is in all probability higher than is desirable.

Bequests to Detroit Hospitals.—Bequests of twenty-five thousand dollars to the Children's Free Hospital and ten thousand dollars to the Harper Hospital, Detroit, were made in the will of the late Mr. James W. Walker.

Medical Education in Great Britain and America.—The following comparison of medical education in Great Britain and in this country has been made in an article published in *Nature*:

"During the last thirty years the feeling has become increasingly insistent, both in this country and in America, that certain radical reforms were needed in the methods of education in medicine. But our American colleagues have been fortunate in having the opportunity and the means for building new schools of medicine to meet the new circumstances and for making drastic changes in their methods of teaching which a variety of circumstances has hitherto prevented us from attempting in Great Britain. Now that the Rockefeller Foundation, by its magnificent generosity, has made it possible for us to embark upon the difficult sea of reform, it is particularly interesting and instructive to study the policy adopted in the more advanced schools of America during the twenty-seven years since the Johns Hopkins Medical School gave the study of medicine in America a new aim and a higher ideal. Though we are a quarter of a century behind our American colleagues in making a start, our delay has given us the advantage that we can profit by the experiments made on the other side of the Atlantic.

"It is not generally recognized here how thoroughly the leaders of medical education in America explored every possible method of education throughout the world, and how much devotion and thought they have expended on experiments to discover, by truly scientific methods, how best to employ the few years that the medical student can devote to the training for his profession. Those who want to understand

something of the spirit and the high ideals that have inspired the American leaders in this great reform movement should read the account of their work and aims in the volume *Medical Research and Education*, issued by the Science Press of New York in 1913. Briefly expressed, the matters upon which chief insistence is placed are as follows: The absolute necessity of (*a*) an adequate preliminary education and a serious university training in the basal sciences, physics, chemistry, and biology, without which foundation it is impossible for the student really to profit from his training in medical science; and (*b*) a method of practical teaching in all branches of professional work, whereby the student can, as far as possible, investigate for himself the facts and theories of each subject under the direction of men who are themselves engaged in research work, and not rely mainly upon lectures and demonstrations to give him merely the *results* of other people's work. In other words, the aim of the reform is to train the student in scientific methods rather than to 'cram' him with traditional lore.

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"The great development in the science of anatomy during the last thirty years has been due mainly to the use of the microscope for the investigation of the structure of the body and for the study of embryology. British anatomy has been hampered by the lack of the facilities for teaching these vital parts of the subject, and has suffered enormously from the lack of stimulating daily contacts with them. In other countries, and especially in America, the cultivation of histology and embryology has not only made anatomy one of the most active branches of medical study and research, but also brought the work of the department into close touch with physiology, biochemistry and pathology, to the mutual benefit of all these subjects, and especially to the student who has to integrate the information acquired in the different departments. It was the radical reforms effected in the teaching of anatomy by the late Professor Franklin Mall at the Johns Hopkins Medical School in 1893 that played the chief part in starting the great revolution in medical education in America. The stimulating influence of the abolition of the methods of medieval scholasticism in anatomy and the return to the study of Nature and to the use of experiment brought about a closer coöperation with other departments and a general quickening of the students' interest in the real science of medicine."

Institute of Hygiene in Paris.—It has been announced in *The British Medical Journal* that arrangements have been made between the University of Paris and the French Government, through the Minister of Health, whereby suitable buildings in Paris are to be converted into a large institute of hygiene. It will be under the general direction of the professor of hygiene, Dr. Léon Bernard, but there will be five sections, each with its director. It will have sections of epidemiology, of social hygiene, food, of industrial hygiene, and of sanitary technology; and a series of laboratories—of bacteriology, chemistry, physics, and physiology—a museum, a library and lecture rooms. Courses of lectures of two standards will be given, the one elementary, for ordinary students of medicine, and the other advanced, for doctors proposing to specialize in hygiene. Instruction will also be given to persons employed in disinfection and as health and school visitors. It is hoped eventually to extend the opportunities for study by establishing courses for architects, engineers and statisticians. The food section will comprise three departments, the first dealing with the chemistry of foods and of adulteration, the second with the damage done by parasites and microbes, the third with the physiology of food and nutrition. An institute of hygiene on similar lines is also being established in the University of Strasbourg.

Nutrition Clinics in Cleveland.—For the first time an intensive course of training has been given as an integral part of a public school system and in connection with an established summer school. The class for intensive work at Cleveland recently closed numbered thirty-five, while the attendance at the lectures in the general course ranged from 125 to 300.

A demonstration class was held at the Murray Hill School at which individual children were used for teaching purposes after the method of the medical clinics in the hospitals. The clinics organized at this time for instruction will be continued as a part of the activities of the department of medical work in the public schools.

A leading object of the course was to prepare a nutrition staff for organized work when the

schools open in the fall. In addition to the school physicians and other workers in the locality there were present representatives from school and child helping associations as far west as Colorado and California.

Military Funerals in Honor of American Physicians.—Two military funerals were held in this country on August 16 in honor of distinguished American physicians. Major-General William Crawford Gorgas, former surgeon-general of the army, was buried with military honors at Arlington National Cemetery, after the observance of three services held at the Church of the Epiphany attended by members of the President's cabinet, members of the diplomatic corps, representatives of American and foreign scientific societies and officers of the Army and Navy. In the funeral procession, General Gorgas' horse followed closely behind the body of the deceased. As the procession entered the cemetery, a major-general's salute of fourteen guns was sounded by the guns at Fort Myer. A brief army service was conducted by the chief of the army chaplains, Colonel John T. Axton. The customary three volleys of musketry were followed by another fourteen-gun salute from Fort Myer.

The military escort consisted of two troops of cavalry, a provisional regiment from the tank corps, a battalion of infantry, two companies of engineers, one company of coast artillery troops, motor ambulance and three bands. Brig.-Gen. Grote Hutcheson commanded the escort of honor.

The honorary pall bearers were Secretary of War Baker, Gen. Peyton C. March, the chief of staff, the justices of the supreme court, chairman of the house and senate military committees, and the vestrymen of the Church of the Epiphany, of which General Gorgas was a member.

The military pall bearers were Major-Generals Tasker H. Bliss, Merritte W. Ireland, Frank McIntyre, P. C. Harris, Enoch Crowder, George Squier, Anson Mills, and William Sibert, Rear Admirals Braystead, surgeon-general of the Navy, and Cary T. Grayson, the President's physician, and Brig.-Gen. Isaac W. Little, and Walter D. McCaw, and former Surgeon Rupert Blue of the public health service.

A military funeral was observed also in honor of Dr. William W. Walcott in Natick, Massachusetts. Dr. Walcott was a captain in the Medical Corps attached to the 101st Engineers, and died in Paris soon after the signing of the armistice. Services were held at the home of Dr. Walcott in Natick. He was buried in Dellpark Cemetery, Natick.

Honorary pall bearers were Col. John F. Osborn of Boston, Lt.-Col. Porter B. Chase of Newton, Maj. Elias Field of Boston, Lt. Alexander Ellis of Boston, Lt. Frederick Howey of Boston, Robert Montgomery of Amherst, Dr. Eugene Kelley of the Department of Public Health of Boston, Dr. P. C. Bartlett of Newton, Dr. G. F. Curtis of Newton, Dr. William C. Hanson of Belmont, and Frederick Dodson of Framingham.

The active bearers were John Andrews, Henry G. Fiske and Ralph Swetland, all of Natick; Maj. Edwin Nielsen of the medical department of the 101st Engineers of Boston; Capt. Horace Z. Landon of the 101st Engineers, and Sergt. William Hutch of Marlboro, who was Dr. Walcott's orderly in service.

BOSTON AND MASSACHUSETTS.

The Adams Nervine Asylum.—The Adams Nervine Asylum, Jamaica Plain, Massachusetts, was founded by the will of Seth Adams primarily for the benefit of such indigent, debilitated, nervous people, who are not insane, as it may be expected will be materially benefited by treatment at the institution. The first patients were received in 1880. Patients must be inhabitants of Massachusetts, and may include non-indigent persons who may be in need of such care as the hospital affords upon the payment of reasonable compensation. Rooms are provided for 36 female and 13 male patients.

During the past year, 189 patients, of whom 154 were new admissions, were under treatment at the hospital. The forty-third annual report states that of these patients 36 received free treatment, while the money received from other patients amounted to about thirty-six per cent. of the expenses. Of the 156 patients discharged, 105 either had recovered or had been relieved by the treatment at the hospital. The occupation room was used by over 100 patients. Six nurses were graduated from the Training School.

The Massachusetts Hospital School.—The twelfth annual report of the trustees of the Massachusetts Hospital School at Canton, Mas-

sachusetts, describes the care and education given by that institution to the crippled and deformed children of the Commonwealth. The work of the school has been carried on successfully during the year ending November 30, 1919, within the appropriation made for that purpose. Only crippled and deformed children of Massachusetts between the ages of five and fifteen, who are mentally competent to attend the public schools, are eligible to the Massachusetts Hospital School; feeble-minded and epileptic children are not admitted. The work of the school is becoming widely known, and visitors representing organizations engaged in social welfare and education of the handicapped are received from various parts of the country. The maintenance of work in various departments has been difficult during the past year because of the impossibility of securing an adequate number of persons qualified for the care and instruction of the children. At no time during the year has there been a full complement of employes.

There were admitted to the Massachusetts Hospital School during the year 1919 eighty-one children, of whom forty-one were boys and forty were girls. The total number under treatment was 340. The average admission age was eight years and ten months. Twenty-nine, or 35.80 per cent., of the children admitted were suffering from some form of surgical tuberculosis, and twenty-three, or 28.39 per cent., came to the institution because of infantile paralysis. Fifty-nine cases,—34 boys and 25 girls,—were discharged. Nineteen of these children became self-supporting and 13 either recovered or were so much improved that they were able to attend public schools in competition with normal children. The school has now a successful alumni of one hundred. As a direct result of training received at the school, the pupils who became self-supporting this year were able to enter upon the following trades: cook, machinist, printer, seamstress, messenger, clerk, poultryman, and teamster. The average age on discharge was fourteen years and one month.

The course of studies at the Massachusetts Hospital School is that of the grammar grade, the students graduating usually at the age of fifteen years. This is adequate for the majority of pupils; but as in some cases more progressive children require further instruction, it is hoped that some arrangement can be made in future, with the Boston School for Crippled Children whereby advanced courses may be given to selected graduates of the Hospital School. Physical condition determines the admission of all pupils to the school, and every effort is made, whether in or out of the classroom, to create and maintain conditions favorable to bodily recuperation and restoration. Students go to the classrooms dressed as for outdoors, and the outdoor work is carried on during the greater part of the year. The system of vocational training followed at the school follows the apprenticeship plan. Many of the social and recreational activities of the children are supervised by the Educational Department. Athletics are pursued to an extent that is surprising in view of the physical difficulties of the children: swimming, roller skating, coasting, ice skating, walking trips, and baseball are all enjoyed by the children.

The annual report states that a study of the admissions since the school was established, including a total of 857 cases, indicates that there are comparatively few crippled and deformed children mentally qualified for special care and training with a view to future self-support whose disabilities are due to hereditary, congenital, or accidental causes. This is contrary to the popular impression. The problem of the crippled child will not be solved until a remedy is sought in the prevention of the acquired diseases.

MEDICAL-SOCIAL WORK AT THE BOSTON CITY HOSPITAL.—The Department of Medical-Social Work of the Boston City Hospital has issued its fifth report, covering the activities of that devise between February 1, 1919, and January 30, 1920. The regular staff of the department includes at present a director, fourteen case-workers, and two clinical workers. In addition, the Training School for Nurses and the School for Social Workers have sent, from time to time, students who have served as assistants to the social workers; there have been, also, a number of volunteers. Because of the limited staff, it is necessary to confine the medical-social work to selected groups of cases. During the past year it was found possible to organize social work in addition to the out-patient clinic already served, for two others, the ophthalmic and the aural.

Special attention has been given during 1919 to the welfare of children. A Children's Pavil-

ion has been opened, where the greater part of the children of the hospital are cared for. For a group of children coming from various departments of the hospital a nutrition clinic was formed and is conducted under the medical oversight of the visiting physicians in the medical out-patient departments. Although this group has been small, the work accomplished directly with the children and indirectly by the instructions given by mothers, has demonstrated the value of the food clinic as a preventive measure. Work for the children in the hospital has been made more effective by the opening of two sunny wards devoted exclusively to children. An average of one hundred children have been to the surgical service each month, and about fifty to the medical. Workers in the Medical-Social Department have been able to assist in the after care of these children by securing prompt and regular attendance in the Out-Patient Department, arranging for care in convalescent homes or in their own homes, arranging for nursing care at home through district nurses making careful provision for diet when necessary, arranging for care in specialized institutions, helping to procure apparatus either through relatives or other sources and by doing family case work and receiving the coöperation of relatives, schools, churches, and relief giving agencies. Educational and recreational work has been planned for children in the wards, and efforts have been made to organize teaching classes for children obliged to remain in the hospital wards for long periods of time. Through a gift of five hundred thousand dollars it has been possible to start a children's library for the ward patients.

Until November, 1919, there was no medical-social worker in the Eye Out-Patient Department. A study of the medical records of the patients in that department showed an evident need of careful follow-up work. It was felt that all possible preventive work should be done for the children, of whom eighty-one per cent. of the group considered were in school where the eye strain was likely to be great enough to aggravate any neglected eye trouble. At least forty per cent. of the patients, 275, made but one visit to the clinic, although their condition required further attention: 50 patients did not return for refraction after "drops" had been given; 40 were myopia cases; 64 were "low vision" children and needed assistance in being admitted to sight-saving classes; and 316 records showed glasses prescribed, but there was no evidence that they had been obtained. A study of the children in the Aural Out-Patient Department revealed a similar need for a social worker there, and an effort was made to establish a personal contact with each child.

The medical-social workers have visited during the past year practically every patient in the maternity ward. Some of the problems of married maternity which have been met are convalescent care, temporary child-placing, and other home adjustments, medical treatment of other children, and legal problems. Unmarried maternity cases have involved long and intimate case work, including readjustments through marriage, child placing, placing of mother and infant, institutional care during treatment of venereal disease, legal action for the support of infants, convalescent care, and mental examination. Individual cases other than maternity cases in the gynaecological ward have been cared for as they have been referred to the medical-social department by physicians. The total number of out-patients who have been treated during the year in this department is 3,554, of whom 1,116 came for the first time. All new patients were visited by social workers.

In dealing with syphilis patients in the Skin Out-Patient Department, the social work involved establishing a personal feeling of confidence and coöperation on the part of the patient within the clinic, following up the patients, which was necessary in 80 per cent. of the cases, and social case work. The social service department continued its work during the year among medical and surgical adults, both house and out-patients, with the addition of occasional patients referred from departments where there is no definite social service organization. During the year there were 2,340 patients dealt with, for whom some form of social record was made. A total number of 4,742 visits were made to patients outside the hospital, either in their homes or to coöperating agencies and institutions.

Statistics on socially recorded work from October 1, 1914, to January 31, 1920, show that the Medical-Social Department of the Boston City Hospital has dealt with 7,338 new patients during that period of time.

WEEK'S DEATH RATE IN BOSTON.—During the week ending August 14, 1920, the number of deaths reported was 218 against 149 last year, with a rate of 15.19 against 9.75 last year. There were 48 deaths under one year of age against 31 last year.

The number of cases of principal reportable diseases were: Diphtheria, 27; scarlet fever, 19; measles, 13; whooping cough, 37; typhoid fever, 7; tuberculosis, 77.

Included in the above were the following cases of non-residents: Diphtheria, 6; scarlet fever, 4; measles, 1; whooping cough, 3; typhoid fever, 4; tuberculosis, 25.

Total deaths from these diseases were: Diphtheria, 2; measles, 2; whooping cough, 1; tuberculosis, 15.

Included in the above were the following non-residents: Whooping cough, 1; tuberculosis, 2.

INCIDENCE AND MORTALITY OF DIPHTHERIA AND SCARLET FEVER IN BOSTON.—The incidence and the decline in mortality of diphtheria and scarlet fever in Boston during the past two decades is shown by the appended table which has been sent us from the office of the Boston Commissioner of Health:

YEAR	—DIPHTHERIA— Cases	Deaths	—SCARLET FEVER— Cases	Deaths
1900	4,977	587	1,710	181
1901	3,319	353	1,398	210
1902	1,986	225	1,122	87
1903	2,073	214	1,479	65
1904	2,538	206	966	39
1905	1,550	132	1,131	44
1906	2,172	152	1,341	39
1907	2,366	144	2,359	49
1908	3,197	204	2,493	104
1909	2,720	193	2,095	82
1910	2,453	158	2,081	59
1911	2,180	124	1,527	74
1912	1,539	102	1,153	32
1913	2,203	156	1,900	77
1914	2,807	169	3,535	65
1915	2,981	218	2,998	79
1916	2,407	185	1,766	39
1917	4,098	278	1,497	46
1918	2,852	217	1,126	24

FEW PRISONERS WITH TUBERCULOSIS IN MASSACHUSETTS PRISONS.—This summer, Sanford Bates, the Commissioner of the Department of Correction of the State of Massachusetts, secured the coöperation of the Department of Public Health, Division of Tuberculosis, for the purpose of examining the inmates of all the prisons in the State.

Tuberculosis experts from the four State tuberculosis sanatoria, under the direction of Dr. William J. Gallivan, Director of the Division of Tuberculosis, examined all of the inmates, 1,571 in number, in fourteen of the state and county prisons. The population of these prisons ranged from five to 510 each.

The result of this examination has just been announced and is a remarkable showing. Only seven out of the 1,571 prisoners were found to have active tuberculosis, one healed and 52 under observation. These seven active cases were transferred promptly to the Prison Hospital for treatment.

It is interesting to note that none of these active cases was found in the state institutions. They were all in the county institutions.

The inmates of the Reformatory for Women and the Bridgewater State Farm were not examined as these institutions have consumptive colonies.

The inmates in two of the Houses of Correction were not examined as it was not desired by those in charge. The balance of the Houses of Correction not mentioned in the 14, were closed.

NEW ENGLAND NOTES.

FRENCH ORPHANAGE FUND.—Contributions to the New England branch of the French Orphanage Fund have reached a total amount of $615,321.80.

Correspondence.

INTESTINAL OBSTRUCTION.

227 Beacon St., Boston,
June 16, 1920.

Mr. Editor:—

I return herewith the corrected copy of the stenographer's report of what I said in the discussion of Dr. Edward Richardson's paper on Intestinal Obstruction. The remarks are unusually accurately reported and I have made but few changes in them. Such changes as I have made are to clarify, not to alter, the meaning of what I said. My remarks provoked some discussion after the meeting (as I intended they should) and I am glad to have them printed practically unchanged, for since I have already gone on record as criticizing the method of organization at the Massachusetts General Hospital before the Massachusetts Medical Society, I wish to be clearly understood. I should greatly appreciate it if you could publish the following in the same edition in which the discussion of Dr. Richardson's paper is printed.

A WORD OF EXPLANATION.

It is probably an offense against good manners to inject into a discussion at a scientific meeting, a criticism of the method of organization of an institution. But good manners and parlor and parliamentary methods are apt to be inert and stand in the

way of progress. Science is only our attempt to record what we believe to be facts. Science is recorded truth. Now we must not only have truth (recorded facts) to work with, but to attain the best results we must have scientific (truthful) methods of using our recorded facts. The truthful use of truth equals efficiency. Good manners are not incompatible, and may be defined as the kindly use of acknowledged lies. Those who have kissed the Blarney stone may be as efficient or inefficient as the rest of humanity.

Year after year at our "scientific" meetings of the Massachusetts Medical Society we go on discussing the reasons for the mortality of such groups of cases as those presented by Dr. Richardson. We have the facts presented and then discuss the operative procedures and the technical methods of dealing with the individual case. But it seems to be against the rules of the game even to mention the influence on the mortality in question, or the organization of the hospital presenting the statistics.

No more striking example could be presented than in the present instance. Intestinal obstruction is one of the gravest surgical conditions, and it is admitted that a surgeon's skill, knowledge and judgment are taxed to the utmost in dealing with it; yet the reader has stated that during a period of ten years 121 cases were operated on by *twenty-three different operators at this one hospital*. Is it not fair then, to ask whether a change in the organization might not result in improving a mortality of 41%? Does this mortality not show a weakness in the seniority system?

There are a number of legitimate arguments in defense of distributing a group of such grave cases among all the members of the staff, such as:

1. It gives each surgeon a little opportunity (about once in two years) of getting some experience in operating on this class of case, so that our community is not dependent on a few surgeons.

2. Such emergencies are apt to come in at night, and the chiefs of service cannot be expected to attend them.

3. Such opportunities are a legitimate reward for the younger surgeons, for much dreary routine work which they do.

4. There are so many other advantages of the seniority system, that an effort to select particularly competent surgeons for every class of difficult cases, would cause more loss than gain to the whole work.

These, and no doubt others, are reasonable arguments for continuing the present organization, but they do not apply to the matter under discussion—namely the causes of this particular mortality and methods whereby it may be improved.

That modern surgery is adequate to relieve intestinal obstruction in a very high percentage of cases, seems to me to be proved by my own series of 27 successive successful cases since 1904. I am convinced that the mortality in this condition should be almost nil, as it is now in appendicitis. Cases should be diagnosed and operated on successfully within 48 hours of the onset of symptoms or somebody is at fault. The patient may not call medical advice; the doctor called may not appreciate the gravity of the case and shift the burden to a surgeon; or the surgeon may attempt too much; or the Trustees of the hospital to which the patient is sent may sacrifice him to the ancient god of the Seniority System. The reader of my paper cannot fail to appreciate, that the Trustees of the Massachusetts General Hospital may be debited with my mortality of 11 out of 14 cases prior to 1904, and credited with the 27 successful cases since. They took this responsibility of offering to a young surgeon, without experience, *an opportunity*, just as they now take the responsibility of refusing my services so that they can give the same *opportunity* to other young surgeons. This being the case, why discuss at a scientific meeting, the mortality of intestinal obstruction?

Finally, let me say this for the Massachusetts General Hospital. There is not a single criticism which now or in the past I have publicly made which does not apply—usually in greater degree—to all the other general hospitals I know of. The Massachusetts General Hospital does at least come forward with the uncamouflaged facts about her results, in such papers as these of Dr. Richardson and Dr. Simmons. She does not conceal, but merely ignores, the question of her system of organization and its shortcomings. It may be best to go on for the next decade alloting a few cases to each surgeon as has been done in the past, but let us discount the influence of this factor at our "scientific" meetings. Let them frankly put the individual cases on the altar of their ancient god, for sacrifice to humanity.

Truth in the application of a scientific fact seems as important as the fact itself. I allege that science has taught us the symptoms by which we may recognize intestinal obstruction and the methods by which we may relieve this condition. All we need now is the organization to apply efficiently what we know. We need to demonstrate and diffuse this knowledge, and the hospitals are the only places where such demonstration can be made to advantage. If, in the next decade, the Trustees of the Massachusetts General Hospital allow 23 more surgeons to gain a little experience each, in the treatment of these grave emergencies, I cannot feel that the house surgeons who assist and the students who look on, will learn as much as if these operations were done by the chiefs of the service or individual members of the staff, selected to study the subject with especial care. They will learn a disregard of true medical ethics instead.

Concerning the statistics given by Dr. Richardson and those of my own paper, I should like to say that there are some points on which they are not comparable, and those points are very much in my favor.

1. I included certain subacute cases: 25, 30, 31, 35, 36.

2. I did not consider cases 16, 19, 23 as having died from intestinal obstruction.

In my opinion, Dr. Richardson should not include cases in his series which died of other causes than obstruction, for the paper is a discussion of this condition. If, for instance, a colostomy was done and later an attempt made to excise a cancer which had caused the obstruction, it cannot fairly be included in the mortality of intestinal obstruction. It belongs with the mortality of cases of intestinal resection for cancer.

E. A. Codman, M.D.

FUNERAL SERVICES OF GENERAL WILLIAM CRAWFORD GORGAS.

The following letter has been published recently in a Boston paper:

Mr. Editor:

Some of us aboard ship had been reading Owen Wister's "Straight Deal or the Ancient Grudge," and perhaps had Rude Britannia and Crude Columbia in mind on landing at Southampton, July 8th. The two young college undergraduates, chance acquaintances of the voyage, coming to England for the first time and on an English liner, had already begun to understand a little about it. One of them, to be sure, had spent 1918 in France in an observation balloon overlooking our line of battle, but he had seen nothing of the British and retained the prejudice acquired from his school histories, which began with Bunker Hill or thereabouts. They were a little uneasy when the passengers celebrated Independence Day aboard and wound up with the "Star-Spangled Banner" and forgot "God Save the King," but this was counter-

balanced by the behavior of an intoxicated Englishman of the class "bounder" and by the rudeness of a group who played deck games all day to the exclusion of others and who subsequently crowded us out of our seats reserved on the boat train. It was not a particularly good beginning for these boys, and we reached London at midnight in a downpour and no hotel seemed eager to take us in.

There was a notice in the paper the next morning that there would be a funeral service at St. Paul's for General Gorgas, and as the Cathedral was on the list of things the boys were to see, and as I wished to go to the service, we met there shortly before soon. They did not quite understand why so many people were about nor why, after all, so much attention was being paid to the passing of an American who had once been a surgeon general, whatever that might be, of our Army, and who had had something or other to do with yellow fever—or was it something else?

Unquestionably, it was in the air that they had stumbled upon a notable occasion and we lingered on the steps to see. Shortly before noon, the most crowded time of day on the busiest of London thoroughfares, the traffic was switched off as by magic, and the streets cleared of people, who stood massed on the sidewalks with bared heads as the funeral cortège approached. It was a most impressive scene—a squadron of cavalry of the Life Guards followed by slow-pacing battalions of Coldstream and Irish Guards still in khaki—the coffin, covered by the American flag, on a gun carriage, flanked by high officials as pallbearers, the General's saddled charger, and then the band of the Coldstream Guards.

The body was carried under the dome, where the representatives of the royal family and an astonishing number of distinguished people had assembled. It was a simple and beautiful service read by the dean—the hymns "Nearer, My God, to Thee," "Lead, Kindly Light"—and when at the end "The Battle Hymn of the Republic" was played by the organ, accompanied by another Guards' band and sung by the assemblage, I could feel my young friends choking and swallowing.

I said good-by to them later, came to Oxford and did not see them again, but they wrote me that five days later they saw the remains of Lord Fisher of Kilverstone, admiral of the fleet, borne to Westminster for a similar ceremony. What surprised them was that the procession was no longer and only differed in being composed of marines with reversed arms instead of Guards, and that the crowds of bared people behaved in the same silent, reverent, British way when their beloved "Jacky Fisher" was carried by as we saw done five days before. I think the boys are beginning to understand.

HARVEY CUSHING.

Oxford, July 15, 1920.

MORTALITY OF CHILDBIRTH.

Mr. Editor:—

It does seem to me that an unfair comparison was made in your editorial of August third in regard to the considerable lower mortality of maternity patients treated by Harvard students at the Lying-in Hospital, and those treated throughout the State by the profession.

As I understand the situation, patients register at the Lying-in Hospital, are examined, the cases that are complicated by disease or those cases which promise to be hard are taken into the Hospital; those that are normal are delivered outside by the students.

The general practitioner is at a disadvantage as he must take cases without selection and, furthermore, as a rule, his cases are not so robust as the aboriginal type of patients that frequent the hospitals of the North and West Ends.

It has been shown that the mortality statistics of women delivered by midwives is very favorable compared to the statistics where physicians were the accoucheurs. There is an explanation of this condition in that as soon as a case becomes pathologic a physician is called in and, if the woman dies, the doctor signs the certificate of death, and, of course, the case is charged up to the mortality statistics of the doctors. In the same way quite a few of these student cases are passed along to the doctors. The family intervene when abnormal conditions develop and a physician is called.

In regard to the "Maternity Bill" which is to come before the Legislature next year, I believe that the great majority of the dooctors of the state are in favor of giving a maternity benefit. I believe that the doctors favor a direct money benefit to the needy woman.

I understand that the trend of the "inner circle" of the profession is to divert part of this benefit to the support of charity workers, social workers, statisticians, etc., so that in the end the act will not be much of a benefit to the parturient woman.

In the present condition of affairs, the woman without funds calls on her local doctor and pays him when she can. Practically all of them pay the doctor in time if they are able to do so. Giving a sum to the parturient woman at the time of her trouble would be a very good thing for the physician and the nurse. The woman in need would be getting nothing more than she is entitled to get.

The little extra taxation, if it were placed where it should be—where all taxation should be placed, namely, on those who are best able to pay; on those where maternity problems are few—would scarcely be felt.

I think that a direct gift to the childbearing mother, without any stipulation as to what hospital or doctor she is to employ, would be to the benefit of the woman and to the medical profession.

In passing, I will say that many of our young medical men, recently returned from the war, are in dire straits. Many of them are not making enough to sustain life. The condition of the profession is becoming intolerable in Boston, due to the flagrant abuse of the out-door clinics at the various hospitals, particularly the Peter Bent Brigham, the Massachusetts General, and the Boston Dispensary. We all know that a very large per cent. of the people who go to these clinics are perfectly able to hire physicians, yet they are encouraged in every way to patronize these clinics to the great detriment of the profession at large.

Nothing is done by the men who are elected yearly to look after the interests of the profession, and no body expects anything will be done in this line so long as the profession remains in the docile condition it is in at present.

The staffs of these hospitals are primarily to blame for the greedy, unrighteous, unfair competition waged by the hospitals against the general practitioner. The staff "leaders" having landed at the top of the ladder adopt the attitude toward the profession that Vanderbilt applied to the dear people when he said, "The public be d——d!"

To revert back to Maternity Benefits, the parturient woman would be greatly benefited. She could have competent medical and nursing care, the profession would be benefited, particularly the younger men, many of whom the hospitals are depriving of a living, and the community would be benefited by having its most useful people properly cared for at the vital time of their lives.

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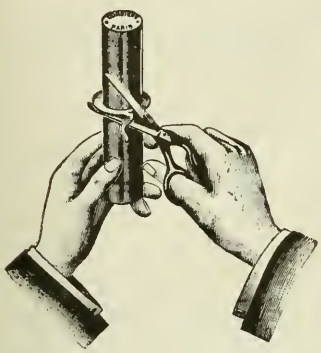

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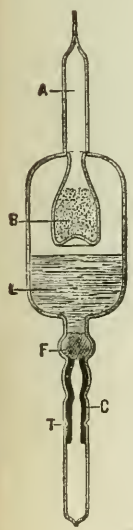

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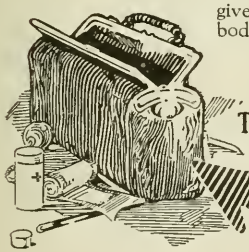

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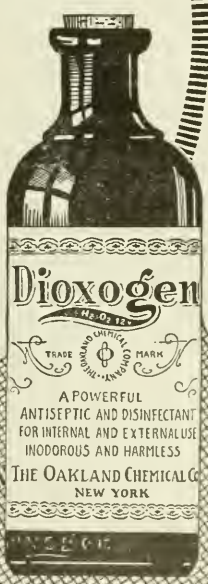

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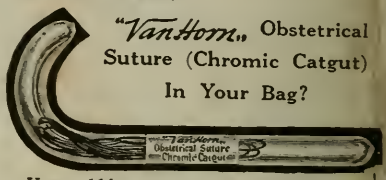

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